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The Silver Jubilee Train, L.N.E.R.

FEW British railway developments of recent years have so successfully caught the public fancy as has the inauguration of the Silver Jubilee train of the L.N.E.R. When the regular service is begun on Monday next this express streamlined train will provide the fastest regular land transport service ever worked between the Metropolis and the Tyneside "capital," and to symbolise the importance of the new link the Lord Mayor of Newcastle and the Mayor of Darlington will travel on the train and will be greeted formally on their arrival at King's Cross by the Lord Mayor and Sheriffs of London. The presence of the Mayor of Darlington in particular will provide a happy reminder that it is exactly 110 years ago since the town he represents saw the opening of the world's first public steam-operated railway. Indeed, the opening on September 27, 1825, of the Stockton & Darlington Railway may be claimed not inaptly as the birth of the L.N.E.R. The new locomotive and train were fully described and illustrated in last week's issue, while on page 511 this week we record some of the notable features associated with the four-hour schedule which is to be maintained daily between King's Cross and Newcastle. The bald statement that an overall speed is just over 67 m.p.h. between the termini, for example, does less than justice to the performance required from the fastest long-distance steam train in the world. When the speed restrictions and other difficulties of the route are considered, however, the enterprise of the L.N.E.R. in introducing the schedule is seen to justify to the full the popular enthusiasm which is greeting the train.

Central Argentine Preference Dividends

The Central Argentine Railway is in an unusual position with regard to its preference capital. It has issued £9,695,718 of 4½ per cent. preference stock which is non-cumulative and £5,000,000 of 6 per cent. convertible preference stock, which ranks after the 4½ per cent., but is cumulative. Dividends on both these stocks were paid in full for the year ended June 30, 1932, but the 6 per cent. stock has received nothing since. In November, 1933, a dividend at the full rate for the year 1932-33 was declared on the 4½ per cent. stock, with the proviso that it should be payable to holders on the registers on October 31, 1933, when in the directors' opinion sufficient funds in cash for the purpose were available in England. It was not until November 15, 1934, that the first half of this dividend, amounting to £218,154, was paid. An earlier payment on account was not possible, as remittances were sufficient only to meet the amounts required for the payment of stores, of interest on debenture stocks, notes, and bank loan, and for income tax. The remaining half, it is now announced, is to be paid on October 4 next to those holders who were on the registers on October 31, 1933. No dividend was declared on this stock for the year 1933-34, and the directors announced in June last that the dividend on the 6 per cent. stock due on July 1 had not been earned and that they were also unable to recommend any dividend on the 4½ per cent. stock in respect of the year 1934-35.

* * * *

The Week's Traffics

In the traffic returns of the four group railways for the past week notable features are the drop in passenger train receipts of all the companies except the Southern, and the contrast between the heavy decreases in coal of the two companies most interested in export and the good increase of the L.M.S.R., with only a small decrease on the Southern. To date the aggregate traffics of the four companies together amount to £110,446,000, an increase of £756,000 or 0.69 per cent., but £29,000 lower than the corresponding figure at the end of last week. Aggregate passenger traffics for the four companies together are up £1,147,000, but merchandise receipts show a net decline of £32,500, and coal traffics are down £358,500.

	38th Week				Year to date.	
	Pass., &c.	Goods, &c.	Coal, &c.	Total.	Inc. or Dec.	%
L.M.S.R.	22,000	14,000	12,000	4,000	485,000	+ 1.10
L.N.E.R.	3,000	4,000	16,000	15,000	33,000	+ 0.10
G.W.R.	4,000	—	16,000	20,000	104,000	+ 0.56
S.R.	7,000	4,500	500	2,000	134,000	+ 0.89

London Transport receipts for the week were £546,500, an increase of £8,500. Amongst Irish railways the Great Northern is £36,750 to the good for the year to date, with an improvement of £20,100 in passengers and £16,650 in goods. The Great Southern increase of £104,086 is made up of £26,655 in passengers and £77,431 in goods.

* * * *

Enjoying a Railway Journey

In a letter addressed to the Editor of *The Times*—published in the issue of September 24 under the above title—a correspondent expresses the view that the pleasure of railway travelling has been much increased for him since he hit upon the idea of taking 1-in. survey maps with him. "I have," he says, "been astonished by the number of things of interest that can be recognised from the carriage window." He continues by commenting upon the excellence of these maps and the manner in which the wealth of information they convey can turn a railway journey into a most delightful and interesting pastime.

After suggesting that the railway companies might well consider the publication of railside maps showing contours and objects of interest, he concludes with the opinion that travel with a map very happily combines the pleasures of mere window gazing and the satisfaction to be obtained from a kind of reading that holds the attention and is never dull. Certain of our main railways have realised this for many years past and have met the need by the production of booklets of the "through the carriage window" type. But in the case of Pullman and restaurant cars and of open type coaches with tables between the seats, the railways might go farther and either provide chained maps or lend them to passengers through the attendants. To anyone who has extensive experience of both forms of transport it will be obvious that such a facility would give the railway an important additional advantage over road travel. For in the average bus on the move, a passenger can never study a map, and even in the best sprung road coach he can seldom do so in comfort, whilst in the case of a private car a special stop is essential. On the other hand, a modern railway carriage with a table is almost ideal for recognising the details of a map.

* * *

Overseas Railway Traffics

A welcome improvement in Central Argentine Railway traffics both in currency and sterling is shown for the past week following on a small gain in sterling for the previous week, so that during the past fortnight the company has improved its earning position to the extent of £22,508 and 354,950 paper pesos. Exchange has averaged 17.03 pesos to the £ for each of the past two weeks, as compared with 17.16 and 17.15 respectively for the corresponding weeks of 1934-35. Other Argentine railways have continued to show improvement during the fortnight, with increases for that period of £19,106 on the Great Southern, £8,251 on the Western, £5,521 on the Pacific, £2,090 on the Cordoba Central, and £1,981 on the Entre Rios. The Canadian Pacific has during the two weeks reduced its previous decrease by as much as £62,800.

	No. of Week	Weekly Traffics £	Inc. or Decrease £	Aggregate Traffic £	Inc. or Decrease £
Buenos Ayres & Pacific ..	12th	70,581	+ 3,817	860,896	+ 22,431
Buenos Ayres Great Southern ..	12th	129,243	+ 10,409	1,427,415	- 46,499
Buenos Ayres Western ..	12th	38,403	+ 3,418	479,787	- 18,735
Central Argentine ..	12th	127,745	+ 22,258	1,424,517	- 94,929
Canadian Pacific ..	38th	645,000	+ 61,400	17,445,800	- 48,000
Bombay, Baroda & Central India	24th	191,850	525	3,612,475	- 56,250

* * *

South Australia and a Commonwealth Railway

The announcement that the Australian Commonwealth Government is calling for tenders immediately for the construction, at an estimated cost of £685,000, of a standard gauge railway from Port Augusta to Red Hill in South Australia, has, according to the Adelaide correspondent of *The Times*, led to a statement by the Hon. H. S. Hudd, Minister of Railways, that the South Australian Government would probably take action in the High Court to restrain the Commonwealth. This line was authorised by the Port Augusta to Red Hill Railway Act of December 23, 1930, at an estimated cost of £735,000, to connect with the standard gauge Commonwealth-owned Trans-Australian Railway from Kalgoorlie in Western Australia to Port Augusta in South Australia. The present route between Port Augusta and Adelaide involves two changes of gauge—one at Port Augusta to the 3 ft. 6 in. Port Augusta-Terowie line, and the other at Terowie to a 5 ft. 3 in. line, and *vice versa*. By the proposed line and the provision of a third rail between Red Hill and Adelaide 70 miles would be saved and there would be no break of gauge between Kalgoorlie and Adelaide. Mr. Hudd said that as the proposed line was substantially for

Commonwealth purposes South Australia could not consent to it without being indemnified against the loss, which was estimated at £40,000 annually. The Commonwealth, he said, had now definitely refused a financial guarantee. South Australia's view was that the work could not be remunerative.

* * *

The Hedjaz Railway

On Monday a press telegram recorded that an official communiqué had been issued in Mecca to the effect that negotiations have taken place between the Saudi-Arabian, British, and French Governments concerning the repairing of the Hedjaz railway. This line was constructed largely to facilitate pilgrimage traffic to Moslem holy places, and from the time construction was begun at the Damascus end in 1901, work was carried through steadily though not very rapidly. Great efforts were made to reach Medina by the anniversary of the Sultan's accession, and on that day—August 31, 1908—the last 156 miles were opened. Much of the southern part of the track was destroyed during the war by the late Col. Lawrence and has not been repaired. The northern sections are at present operated by the British and French authorities responsible for the post-war government of Transjordan and Syria. Southward of Maan there is no service, as the mandated territory finishes not far from here; the actual frontier is at the derelict station of Kalat el Mudawara. About eight years ago the question of repairing the line and opening a service was discussed, and at that time suggestions were made for extensions to be built to Mecca and Jedda, and to Yanbo. These proposals fell through, however, and the subject has only now been revived.

* * *

New London Suburban Electric Services

As we announced last week, the Southern Railway winter timetables, which come into force on Monday, include the use of two new electrified sections. These will be the line between Lewisham Junction and Nunhead connecting the Charing Cross-Dartford line with that from St. Paul's to Catford; and the line from Woodside to Sanderstead. The lengths newly electrified are only 1½ route miles for the Lewisham line and 3 route miles for the Woodside-Sanderstead line, but the importance of the electrification and the effect on traffic will be out of all proportion to the size of the lines. The Lewisham link enables a new business-hour service to be inaugurated on Monday between St. Paul's and Dartford, via Bexleyheath and via Sidcup, thus connecting former South Eastern Railway lines with an L.C.D.R. City station, and relieving congestion at London Bridge. On the Woodside-Sanderstead line there will be approximately a half-hourly all-day service to and from Charing Cross and Cannon Street, with additional trains during the rush hours. The approximate cost of the new electrification works is £233,000.

* * *

A Road-Rail Proposal in the Sixties

In an editorial note in our issue for July 28, 1933, we referred to the use of a motor road-rail vehicle between Rotterdam and Ostvoorne on the 3 ft. 6 in. gauge lines of the Rotterdam Tramways Company. This service may be regarded as a practical realisation of an idea broached in the earliest days of tramways in the Netherlands, where that system of transport found extensive application. In some interesting historical articles by Mr. W. A. Askamp in our contemporary *Spoor en Tramwegen* we read that a tramway promoter named Soetens, who obtained a concession for a line from the Hague through Rijswijk to Delft in the early sixties, met with

an objection to rails in the roadway from certain local authorities when seeking to be allowed to make an extension through the Hague to Leiden. He therefore asked to be "granted permission to terminate the rails at the entrance to the districts concerned and haul the vehicles through the streets by means of additional horses, like any other vehicle, to allow of which the company shall equip them with appliances enabling this to be done readily." Whether Soetens, who apparently was not much in favour with the authorities and obtained no further concession, ever carried this idea into effect elsewhere we cannot say, but his way of meeting the objections of his opponents is interesting in the light of present day developments.

* * * *

Water Trough Tests in America

As a result of tests conducted a few years ago, the New York Central System has adopted as standard certain conditions regulating the supply of water to locomotives at speed. The factors investigated were the design of troughs and their setting in relation to rail level, the depth to which the tender scoop should penetrate, and the most economical speeds for picking up water. Ninety-one trial runs were made with a test train at three different sets of troughs, as a result of which it was found that under the conditions established as most suitable, namely, with the troughs filled to within 1 in. of the top, the water-level 2 in. below the top of the rail, and the scoop immersed to a maximum depth of 4 in., the volume of water delivered was unaffected by speed up to 45 m.p.h. Between 45 and 55 m.p.h. a very slight drop in efficiency was noticed, which became more pronounced above those limits. A maximum speed of 50 m.p.h. has therefore been standardised for picking up water. The type of trough now adopted has two side inlets delivering water longitudinally in the direction of traffic, an arrangement which builds up a higher level at the centre than at the sides, without overflowing. The tests and their results were described by Mr. W. L. Curtiss, who was in charge of the investigation, in a recent issue of *Railway Maintenance and Engineering*.

* * * *

The Art of Engine Driving

Comparatively few descriptions of locomotive performance in ordinary service have been published which show the actual details of the engine working. These however frequently exhibit some strange divergences in driving methods. In the article published elsewhere in this issue, particulars are given of two runs recorded by a correspondent with L.N.E.R. Pacifics. On the first of these, the engine was, generally speaking, worked at 25 per cent. cut-off throughout. At each start, except that from King's Cross, the gear was notched up rapidly from the initial 65 per cent. to this figure, and it was only from Wood Green up to Potters Bar and on the upper part of the ascent to Stoke that a longer cut-off was used. When easier running was required, the driver used a partly closed regulator. On a route of less pronounced grades, we recently noted a case where the cut-off was changed constantly by about 2 per cent. either way to suit every change in gradient. At the opposite extreme was a driver who maintained an unchanged cut-off for 180 miles over an undulating road with a ruling grade of 1 in 100, during which time speed varied between 35 and 90 m.p.h. Individual engines sometimes need special handling, but it is not uncommon to find wide differences of opinion between drivers as to the correct method of handling the same engine. The introduction of a new type might well be made the

occasion of definite instructions being issued as to the correct method of driving, instead of the matter being left to the discrimination or experiments of individual enginemen. The same method might also be applied to the closely allied question of making up lost time, of which the present article contains two praiseworthy examples.

* * * *

Firing a Locomotive Automatically

The Baldwin Locomotive Works has built for shunting service in the yards of their Burnham establishment an oil fired saddle tank locomotive which fires itself, the fire being regulated by the steam pressure. No blowing off of steam ever occurs because when the pressure reaches a few pounds below the blowing off point the fire is automatically reduced, and the points at which this reduction and subsequent increases occur cover a substantial working range. In the present locomotive the fire has three positions, *i.e.*, low, intermediate and high, but four or five can be provided if necessary. No steam or fuel is wasted, and the fuel used is bunker oil of which, with the low flame in operation, about four gallons are used an hour, costing approximately 15 cents (7½d.). The driver's only function is to control the speed and movements of the engine. Records indicate that so far only about 35 per cent. of the B.T.U.'s are required in this locomotive as compared with the same work on the coal fired shunting engines originally used. The engine is fitted with roller bearings, partly to simplify lubrication and partly to eliminate adjustment of driving boxes. Mr. Robert S. Binkerd, Vice-President of the Baldwin Locomotive Works, states that this locomotive has just as high availability as any internal combustion locomotive, can be operated by one man with equal facility, and has at least double the thermal efficiency of the conventional coal-fired shunting engine.

* * * *

A Heavy Continental Freight Locomotive

The new three-cylinder single-expansion freight locomotive of the 2-10-2 type, now in course of construction at the Grafenstaden workshops of the Alsace-Lorraine Railways, represents in its design and general proportions an advance in some respects upon the previous standards in use, not only on this railway but the majority of European railway systems. The engine has been designed for working over the heavily graded sections on the Thionville-Völklingen, Thionville-Audin-le-Roman and Thionville-Luxembourg lines where reverse curves of 500 m. (1,640 ft.) radius are encountered in conjunction with some continuous heavy grades. To meet these conditions it was necessary to provide an unusually powerful locomotive and the decision was reached to utilise three large single-expansion cylinders 22½ in. diameter by 28½ in. stroke, with ten coupled wheels, a combined heating surface of 3,725.0 sq. ft. and 53.8 sq. ft. grate area. The distribution of the weight of the engine, which amounts to 119 tons without tender, is such that approximately 98½ tons are available as adhesive weight. The engine is fitted with a booster and develops a theoretical tractive effort at 85 per cent. of the boiler pressure, with the booster, of 107,075 lb. Thus all the attributes of a high power output are present in the design. For distributing steam to the cylinders Caprotti poppet valves have been adopted, and the arrangement of the cylinders themselves incorporates features of a special kind, which, together with the general design of the locomotive, was developed by the Office Central d'Etudes de Matériel de Chemin de fer (O.C.E.M.). The locomotive and the services it is to perform are described elsewhere in this issue.

The Welwyn Accident Report

WHILST it is so far satisfactory that the cause of the collision of June 15 at Welwyn Garden City has been narrowed down by Colonel Mount in his report—summarised on pp. 506-11 of this issue—to a serious lapse on the part of signalman Howes at that place, we should have preferred that his actual offence could definitely have been named. To quote Colonel Mount, Howes "either inadvertently transmitted the out-of-section bell signal and cleared the down instrument—for No. 825A—for an up train—the up goods No. 787—which was passing at the time, or he operated the instrument with intention, and accepted the following train, No. 826, having overlooked train No. 825A." Colonel Mount himself differentiates between the two possibilities, in that the clearance of the down, instead of the up instrument when an up train was passing, is referred to as an act of inadvertence, but to clear the down instrument for a down train that had not arrived was an act of intention. With such alternative definitions all will agree. The former conclusion—which we may call the minor offence—is that suggested by the railway company, but it is not the explanation offered by the man himself. He said, "I have no idea how No. 826 got into the section, as I know nothing whatever about it. I am quite sure I did not overlook No. 825A, and I knew all about that train but nothing about No. 826." Colonel Mount was, however, satisfied that the out-of-section signal for No. 825A was sent by Howes to Crowe in Hatfield No. 3 Box, and that No. 826 was then at once accepted by the former man. Such a denial of all knowledge of No. 826 cuts out any admission that No. 825A was irregularly cleared and Howes cannot therefore offer any such excuses as did the man concerned in the Winwick Junction accident a year ago or the man in the King's Langley case last March.

Taking the cause to have been the inadvertent clearance of No. 825A on the down instrument instead of an up goods on the up instrument, we are not only offered the more generous explanation but also that suggested by the railway company. Two witnesses of experience said that they had had previous personal experience of that having happened. Such a mistake should not, of course, have occurred and, only naturally, some explanation for the error is sought. Colonel Mount says, "I find it difficult to avoid the opinion that Howes' breakdown was due to what might certainly be expected to have been the more likely cause, *viz.*, forgetfulness and inability to cope with temporary pressure involving quick sequence of bell signals and semaphore operation." Two incidents that had occurred since the man went on duty at 10 o'clock must be referred to. The first was that when he entered the box he was handed a disciplinary notice, and the second was that twice, during the hour or so that he had been on duty, he was hindered in his regular work by a telephone inquiry from a porter as to a message being sent to the station staff at Hatfield about a missing parcel. He had dealt with eleven up and ten down trains in the 85 minutes he had been on duty, a number considerably above the average for the shift, and after the passage of No. 825 the sequence of events appears, in the opinion of Colonel Mount, to have become too much for him. It may be that when he was busiest, he was interrupted by the conversation with the porter as to the missing parcel. It is quite likely, also, that at some moment, when he noticed the down instrument recording *train entered section* he may have thought that he had failed to clear No. 825—the train which preceded No. 825A. Colonel Mount therefore says that, in all the circumstances, he finds it difficult to satisfy himself that Howes was really a suitable man to be serving in such

an important box and he thinks that the man's failure proved, in fact, that he was not.

It is a matter for great satisfaction that a Ministry of Transport report on so serious an accident should contain no criticism of the railway company's methods and should have so few recommendations, and those of a minor character. The question of tail lamps, the report observes, has received considerable attention lately. The control of block instruments by track circuit is a comparatively recent requirement, as is the release of the starting signal by *line clear* acceptance. The position of block instruments and the toning of the block bells have not before been mentioned in an accident report. Nevertheless they are matters that call for a change and such a change would be in keeping with modern practice in other directions. The need for precise and definite phraseology in telephonic conversations concerning block signals has, apparently, already received recognition by some of the companies, and Colonel Mount's comments will no doubt lead to uniform action. From the evidence given in this case it would appear that, as a consequence of the Colonel's report on the collision of February 23, 1924, at Stoke Works Junction (see THE RAILWAY GAZETTE of July 7, 1924), the procedure as to handing disciplinary notices to signalmen was altered. The present instance suggests that all such notices should be delivered to signalmen at the end of their turn of duty. Finally, it is pleasant to notice the generous and well-merited tribute paid by Colonel Mount to the outstanding service rendered by the buckeye coupler. In his tenth remark he points out not merely that it is a safeguard against telescoping but also that it was instrumental in preventing a heavier casualty list.

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Netherlands Railways

THE results of this undertaking, which combines the working of the company for operating the State Railways with that of the Holland Railway Company, show that the economic conditions of the Netherlands in 1934 were not so good as in 1933, railway traffic suffering accordingly. Competition from road motor lorries was more keenly felt and international traffic suffered under the many restrictions and disturbances caused by the financial situation in various countries. A law passed in July, 1934, gave the management a free hand in the matter of freight rates and relieved it of the obligation to publish particulars of special charges and reductions, previously a great advantage to competitors. The opening of the first portion of the Twente Canal, connecting the industrial district round Almelo with the IJssel and the Rhine, and of the Juliana Canal, had an adverse effect on railway traffic, while some new sections of line were opened which cannot as yet afford any prospect of yielding an adequate return. The result was that receipts fell by 10 million florins, while costs were reduced only by 5,300,000 fl. leaving a net fall of 3,700,000 fl. over 1933. The results may be tabulated as follows:—

	1934 Fl.	1933 Fl.	Difference per cent.
Passenger and parcel receipts	57,976,857	61,776,908	-6.15
Goods receipts	49,014,628	54,941,088	-10.78
Total receipts, including other sources	112,381,595	122,437,754	-8.21

The total decline was less than in 1933, when it was 12.25 per cent., but, as in that year, passenger receipts were higher than goods. There were again fewer passengers, a decline being recorded in the 1st, 2nd and 3rd classes of 13.28, 10.65 and 4.05 per cent. respectively. The fall in inland goods traffic receipts was 10.35 per cent.; in traffic to or through Belgium 16.74 per cent.; and to or

through Germany 9.45 per cent. Tonnage fell 2.45, 10 and 4.84 per cent. in the three cases. Operating expenses were 104,143,262 fl., as against 104,461,502 fl., or 4.86 per cent. less. Of this sum, 77,881,000 fl. was for salaries and wages. At the end of the year 35,535 persons were being employed, about 900 less than at the end of 1933. The operating surplus was thus 8,238,333 fl., compared with 12,976,251 fl. in 1933. Interest, repayment, and other charges turned this into a loss on the undertaking of 30,798,164 fl., against 27,090,971 fl. in the previous year. This amount is divided among the State and Holland companies in proportion to their holdings in the undertaking, 18 and 22½ millions respectively, in sums of 13,688,073 fl. and 17,110,091 fl. As the State guarantees the shareholders 4 per cent., it has had to allot 32,418,000 fl. for the purpose, compared with 28,710,000 fl. in 1933.

Many improvements were introduced in the course of the year. As from January 1 all goods trains were operated with the Kunze-Knorr air brake. Electric traction was extended from Rotterdam to Dordrecht on May 15. White signal lights were abolished and the red, yellow, and green system introduced, the change on the entire system being made in one day. Some forty diesel-electric trains were placed in service on main line sections, but unfortunately, as recorded at length already in our pages, a great deal of trouble was eventually experienced, most of the trains having to be withdrawn. The difficulties were at length overcome, but not in time to enable the service to be resumed in the year under review. Some lines in South Beveland were closed to passenger traffic, while the law above referred to empowered the State to take over a number of lines as from the close of the year. New lines were opened between Sittard and Born (7.25 km.) on May 7; Schaesberg and Simpelveld (12.59 km.) on June 15; and Gouda and Alphen (17.52 km.) on October 7. On the other hand, some sections were closed entirely, totalling 82.8 km., so that there were about 45 km. less route being worked at the close of the year than at the commencement, leaving 2,425 km. of main lines, 977 km. of branch lines and 174 km. of light railways worked by the concern. Of these, approximately 2,033 km. were State property, about 813 km. belong to one of the two companies, and 729 km. to other parties.

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The Van Sweringen Railroad System

A SENSATIONAL break-up of the huge Van Sweringen railroad system of 25,000 miles might quite well result from the proposed auction in New York on September 30 of the collateral security which controls that system. The remarkable rise of the two Van Sweringen brothers to a position of great power in the world of American railroad finance dates from 1916. These two Cleveland real estate men, with the backing of the famous banking firm of J. P. Morgan & Co., and the aid of some profitable financial deals, developed a little tramroad in Cleveland, with many ramifications, into a railway system valued at between £200,000,000 and £300,000,000. A chief factor in this development was the control of the Nickel Plate Railroad acquired in 1916 from the New York Central. The Nickel Plate system duplicated other New York Central mileage, and was sold to the Van Sweringens because they were friendly to the New York Central. The acquisition of the Nickel Plate, which gave the brothers a direct right-of-way from their properties to the centre of the city of Cleveland, involved, according to popular report, no cash investment on their part. They secured an option for the purchase of the line, a small

cash payment being stipulated, with the balance of the purchase price in notes. The option was, according to report, deemed so valuable by bankers that they readily advanced the necessary cash payment.

Nickel Plate stock when bought was used as a collateral security for loans which helped to acquire a controlling interest in the Chesapeake & Ohio, the Erie, the Pere Marquette, the Hocking Valley, the Chicago & Eastern Illinois, the Denver & Rio Grande Western, and the Missouri Pacific with its affiliates, the International Great Northern and the Gulf Coast Lines. At the same time the Van Sweringens created several connected holding companies, including the Alleghany Corporation and the Chesapeake Corporation which held the stock of the various railroads, and the stock and bonds of the holding companies were sold to the public by J. P. Morgan & Co., the New York Central bankers who have handled the Van Sweringen financing. At the top of the financial structure is the Vaness Company, which owns 100 per cent. of the stock of the Van Sweringen Company, and also the Alleghany Corporation, which in turn controls the Chesapeake Corporation. Some details of this complicated financial structure were given on page 221 of THE RAILWAY GAZETTE for August 11, 1933.

The most important block of securities involved in the proposed sale consists of approximately half of the 4,000,000 odd shares of common stock in the Alleghany Corporation ownership of which carries the controlling voice in the Chesapeake & Ohio Railway, which holds the dominant position in the other Van Sweringen lines in the east. The Alleghany Corporation also has working control of the Missouri Pacific and the Denver & Rio Grande Western which are now in process of reorganisation. Although the control of this huge system of 25,000 miles of railway (as well as valuable real estate and extensive motor lorry services) is at stake in the proposed sale, it hangs upon a ridiculously small sum in comparison with the £600,000,000 book value of the properties. As a result of the auction on September 30, it is understood that the banking relations between J. P. Morgan & Co. and the Van Sweringens will cease. The Van Sweringen issues were among the first to break in the Wall Street crisis of October, 1929, and the Van Sweringens are stated to have overdue bank loans amounting, with interest, to \$51,000,000. The Van Sweringens have announced their intention to enter a bid at the sale, so perhaps they may yet succeed in retaining control of the properties, and the action of the brothers at the auction will be viewed in U.S.A. railroad circles with great interest. It is suggested that J. P. Morgan & Co., who wanted to get rid of the Nickel Plate in 1914 when the New York Central was reorganised, have now unloaded and therefore have no use for the Van Sweringens except to collect the balance by foreclosure.

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The Kaiserin Elisabeth Railway

THE necessity of a railway following the old trade route westwards from Vienna was recognised soon after the steam locomotive made its appearance. In 1841 the Austrian Government planned to make State railway routes connecting Vienna with the Adriatic and with Bavaria, but the western line was not undertaken owing to the many years involved in discussions with Bavaria concerning the best route to follow on her territory. In 1851 it was practically agreed that the railway from Munich should pass through Salzburg to Bruck, to form a connection there to the Südbahn and thence to the Adriatic. The line from Nuremberg was to come via Passau to Linz and a connection be made thence to

Salzburg, so that the Südbahn could be reached from each of two chief Bavarian cities. (The connection from Linz to Vienna was left over for the time being as there was already a steamboat service between those places.) The mountainous nature of the country made it most unlikely that this route could be completed within a reasonable time, and in 1853 Karl Ritter von Ghega, the well-known builder of the Semmering Pass line, caused plans for a Vienna-Linz line to be prepared. About this time the State found itself with insufficient resources to enable it to make the lines which seemed essential to the development of Austrian commerce, in consequence of which an eminent Viennese merchant, Lindheim, took up the question. The State had decided that, if possible, a line as planned by Ghega should be made, and Lindheim, in association with Merck the Austrian Consul in Hamburg, sought to obtain the concession, including the continuation from Salzburg to Munich and Kufstein. In order to bring connecting routes under a common management, Lindheim and Merck proposed to take over the North Tyrol line, then being built by the State, between Kufstein and Innsbruck. The concession was granted in March, 1856, without all the plans being ready, and a new agreement was made with Bavaria covering the altered route, but the North Tyrol line was not included.

Ghega had studied several routes, on each side of the Danube, for the Vienna-Linz section, and finally selected the south bank, the line passing through Kloster-Neuburg; for military reasons, however, the State wished for the section from St. Pölten to the capital to pass via Reka-winkel to Fünfhaus, Vienna, with a branch to the Südbahn at Meidling. Construction was begun in 1856, under the direction of Hofrat Karl Keissler, originally chief of the railway department of the Ministry of Trade and who had been persuaded to join the company. He it was who broke with the idea then prevalent in Austria that railway buildings should be cheerless and ugly, insisting on those for the new line being artistically built. On May 25, 1860, a trial run was made from Vienna to Salzburg and in July the Empress Elizabeth herself used the line to reach Pöschhofen in Bavaria. With the completion of the section between Salzburg and Traunstein, on August 12, 1860, Munich and Vienna were connected by rail. The branch from Wels to Passau was opened in the following year (1861). Traffic which had been diverted through Prague and Frankfurt was now able to follow its old accustomed routes. A sketch map on page 486 clearly shows this.

Connection with Innsbruck was dependent, however, on a line in Bavarian territory through Kufstein, and this was found unsatisfactory after the war of 1866, when Austria left the German Confederation, and when, in 1871, Bavaria became part of the German Empire the inconvenience became more marked. To remedy this it was proposed to make a line from Salzburg through Bischofshofen to Wörgl on the Kufstein-Innsbruck line, and at the same time to join up with the Kronprinz Rudolf Bahn, from St. Valentin to Villach, which had just been started. The portion from Selztal to St. Michael was already under construction. Several persons busied themselves with this plan and a contractor named Schwarz received the concession for the Salzburg-Hallein portion in 1869. The State negotiated with the other two lines for the construction of the remainder of the line, to be called the Giselabahn, and finally made an agreement with the Kaiserin Elisabeth Company, which consented, in November, 1872, to absorb Schwarz's portion. The line was not difficult to make, but the original 135-metre tunnel between Taxenbach and Lend collapsed on June 10, 1875, and a new and longer one (427 metres) had to

be made. A temporary deviation was built and over this Emperor William I of Germany travelled to Gastein. The railway was opened to the public on August 6, 1875; Kessler, who travelled with the first train, retired from the service not long after. In 1882 the Kaiserin Elisabeth Railway was taken over by the State, which at this time was completing the Arlberg line.

* * * *

The Lynton & Barnstaple Railway

IN accordance with the official notice from the Southern Railway, published in THE RAILWAY GAZETTE of August 23, the Lynton & Barnstaple Railway is to be closed after Sunday next, September 29. The railway, authorised by the Lynton & Barnstaple Railway Act, 1895, was opened on May 16, 1898, having taken only two years to construct. Its length of 19½ miles on the 1 ft. 11½ in. gauge was constructed at a cost of £3,000 a mile for permanent way, exclusive of the price of land, and there are three halts and five stations in addition to Barnstaple, where a separate platform for narrow gauge trains forms part of the main station. The present service is six trains each way every week-day and an extra train each way on Fridays and Saturdays, and one train each way on Sundays. Since July 1, 1923, it has formed part of the Southern Railway, which acquired it under the powers of the Southern Railway Act, 1923, at the price of £31,061 for the railway, plus £7,307 for 4 tank engines, 17 coaching and 24 merchandise vehicles, and £899 for land and buildings. Being a narrow gauge line it was outside the grouping arrangements of 1921. The capital of the Lynton & Barnstaple Railway was £85,000 in ordinary shares, and there were loans amounting to £42,400. Dividends of ½ per cent. were paid for each of the years 1913 to 1921 inclusive on the ordinary shares, and the railway was, like the main lines, under Government control during the war period, taking its share of the Government compensation awarded in 1921. Its best year before the war was 1913 when railway gross receipts were £9,668, working expenses £6,640, and net receipts £3,028. In 1922, its last year of separate working, receipts were £14,511 and expenses £14,948, and no dividend was paid on the ordinary shares.

Since its acquisition by the Southern Railway the equipment has been brought up to date, carriages re-upholstered, new goods rolling stock provided, and a new locomotive was purchased as recently as 1925. A short length of the line is laid with steel sleepers. The ruling gradient is 1 in 50, there is a stretch of nine miles of this. The time allowed for the journey including seven stops is 1 hr. 32 min., from Barnstaple to Lynton, mostly on a rising gradient, and a few minutes less on the return journey. The railway passes through most beautiful scenery and its closing will be regretted by many. It is a melancholy reflection that this interesting narrow-gauge railway, which owed its inception to the late Sir George Newnes just over 40 years ago, and notwithstanding all that the Southern Railway Company has done to improve the undertaking, should be found too unremunerative even as a feeder line under modern conditions to be kept open any longer.

THE FLYING SCOTSMAN.—The L.N.E.R. has announced that, during the past summer, the Flying Scotsman on its daily non-stop runs between London and Edinburgh has covered a total of 47,000 miles with a loss of only three minutes on schedule times. On two occasions only has the train arrived late and the delay in each case was due to engineering operations on the permanent way.

PUBLICATIONS RECEIVED

Railways Athletic Association Official Year Book, 1934-35. 5½ in. × 8½ in. × ¾ in. 299 pp.—With a foreword by the President of the Railways Athletic Association, Sir Herbert A. Walker, K.C.B., followed by a veritable portrait gallery of the principal railway officers in this country who support the association as vice-presidents, full particulars of the constitution, scope and objects of the many clubs representing all phases of outdoor and indoor amateur sport affiliated to the R.A.A. are given. Throughout the description of the year's work runs a note of progress and expansion which must be very gratifying to all taking part in the good work of this association. Doubtless, as Sir Herbert Walker states, the organisation of so many events has been the means of many friendships being formed and, apart from individual successes, he particularly notes proof of the team spirit so invaluable in work as well as in play. All railwaymen interested in athletics and indoor sports will find notes of some club or association catering for their interests here. The Hon. General Secretary is Mr. P. W. Holdaway, "Vallauris," 34, Redford Avenue, Thornton Heath, Surrey.

Railway Engines. By R. Barnard Way. London: 1935. Cassell & Co. Ltd., La Belle Sauvage, E.C.4. 10 in. × 7½ in. 128 pp. Fully illustrated. Price 3s. 6d.—Conscientious parents in search of railway books for Christmas or birthdays must often have groaned at the difficulty of finding specimens of such juvenile literature differing otherwise than in their illustrations. To their rescue has come Mr. Barnard Way, with lively pen and ready pencil, bringing a book which (on his own authority) is "quite different from any of the others" by non-expert writers. It differs in arrangement and in presentation of fact. Instead of devoting half to railway history and half to modern practice, with little or no indication of the link between the two, the author concerns himself throughout with the process of development—both why it came about and how it was achieved. The illustrations, all chosen to amplify the text instead of as picturesque variants to pages of letterpress, are from his own drawings, and he acknowledges his indebtedness to THE RAILWAY GAZETTE for the loan of photographs on which to base his sketches.

It is impossible not to be impressed by the energy and evident enthusiasm of the author's writing, a most valuable asset at a time when so many able and popular pens are being enlisted in the praise of aircraft and motorcars, exposing the railway field to the incursions of the mediocre. A determinedly critical scrutiny of Mr. Barnard Way's pages would undoubtedly reveal places where his statements are, to put it kindly,

sweeping, and even errors of precise fact, but such instances are few and in no way prejudice the success with which the book achieves its purpose.

The scope of "Railway Engines" is actually wider than its title implies, for it includes notes on such subjects as signalling, brakes, travelling post offices, and electrification. Typical examples of streamlined trains and railcars are given, with a diagram showing the effect of such design on airflow. The story of the steam locomotive is brought up to the *Cock o' the North*.

Locomotive Engineers' Pocket Book, 1935. London: The Locomotive Publishing Co. Ltd., 3, Amen Corner, Paternoster Row, E.C.4. 6½ in. × 3½ in. 400 pp. Illustrated. Price 3s. 6d.—The 1935 edition of the "Locomotive Engineers' Pocket Book" contains all that was valuable in the 1934 edition and a little that is new, room being made for this by adding eight pages and by omitting some tables of metric equivalents. The chief addition is a list of railways the world over with their gauges and mileages, for which acknowledgment is made to the "Universal Directory of Railway Officials and Railway Year Book." No one will regret the substitution of railway information for figures which can readily be obtained elsewhere, but in this year's pocket book the editors have carried out their plan of eliminating general information so thoroughly that the process must be practically at an end. Next year they will have to look a long while to find the page that could be filled to better advantage.

The section on superheating has been improved by a reference to steam driers, and the table of British Standard Specifications has been rearranged to include more information in the same space. The section on representative locomotives of various railways brings in the Southern Railway "Schools" class for the first time, but the 4-6-4 tank locomotives of the old Brighton line are still included in the list, although they are in process of conversion to 4-6-0 tender engines. On page 224, due to a small slip, the L.M.S.R. is credited with 15 types of 4-6-2 locomotive, and only two types of 4-6-0. Metropolitan Railway locomotives are no longer listed, and in the line drawings of representative types the 4-4-2 and 0-6-0 are omitted for the first time. The table of the fastest runs on British railways in 1934 shows no improvement for the year worth mentioning. On the other hand it shows but one fast Mangotsfield to Gloucester train in place of two, and a decline in speed on this route from 61.7 m.p.h. to 59.8 m.p.h. The water density table of D. K. Clark has been replaced by one due to Marks and Davies, and the section on bearings has been extended by two pages which, however, appear from

their numeration to be an advertisement for the Peyinghaus product. The section on internal combustion locomotives is unchanged, but progress in this field during the year has been in the extended application of existing types rather than in the development of anything new. The cover of this little book is blue with gilt lettering and the quality of the paper and printing has been fully maintained.

Steel Forgings.—Representative illustrations of steel forgings carried out at the works of Hadfields Limited, Sheffield, have been collected in a new booklet issued by the firm. Shafts, crankshafts, and axles, and special forgings for turbine rotors and reduction gearing are among the classes of work shown. Tables of carbon and alloy steels, with notes on typical applications of the various grades, are included in the brochure. The equipment at the heavy forging plant of Hadfields Limited is capable of handling shaft forgings over 40 ft. in length.

Molybdenum Steels.—High Speed Steel Alloys Limited, of Widnes, has published an illustrated handbook on Molybdenum steels by Julius L. F. Vogel, M.I.E.E., M.I.M.M. (General Manager) and W. F. Rowden (Alloy Development Department). The price is five shillings. The chapters deal with Molybdenum and its properties, its addition to steel, the casting, forging, rolling, stamping, and rough machining of Molybdenum steel, and general information regarding the various types of the material and their economic value. Tables at the end of the book show the results of commercial tests and will be of value in assisting the selection of a suitable steel for most purposes. Among the examples of the application of Molybdenum steel selected for illustration is the L.M.S.R. Pacific *Princess Royal*, in which the coupling rods, connecting rods, &c., are of this material.

Reduction and Variable Speed Gears.—J. Stone & Co. Ltd., of Deptford, sends an illustrated catalogue of chain gearing including the P.I.V. (positive infinitely variable) gearbox for a continuous change of ratio up to 6 to 1. In these units power is transmitted from the fixed to the variable speed shafts by a specially constructed chain running between expanding pulleys of the opposed conical disc type. The mechanism runs in an oil bath, the replenishment of which constitutes practically all the maintenance required, as chain tension is adjusted by means of an external screw. Speed is varied by a hand-wheel or control level. The gearboxes are illustrated in use for driving many types of industrial machinery. Automatic speed control can be applied to units used in conjunction with cutting machinery where the cutting speed must be kept uniform although the travel of the tool is varied. Speed reduction and balance drive units, both incorporating worm gearing, are also illustrated and described.

THE SCRAP HEAP

ARNOLD BENNETT ON THE G.W.R.

"I left Paddington at 10.30 Friday 13th, 13 coaches on the train. The Great Western is the line. So smooth. So polite. West country politeness. So fast. 186 miles to Exeter and done in exactly 180 minutes. As fast as the *rapide* from Paris to Boulogne, and yet no liquid spills out of the glasses. The country gets richer and richer, and the villages and towns neater and neater. The whole line is brushed and oiled and painted. The stations look as if they might be model stations exhibited at Wembley. At the end of the 186 miles the train seems to be as clean as at starting. I went into the lavatory: spotless. The weather gradually improved, and warmed, and the sun shone on the richly treed hills."—FROM A LETTER BY THE LATE ARNOLD BENNETT WRITTEN FROM *Yacht Marie Marguerite*, SALCOMBE, JUNE 13, 1924, PUBLISHED IN "ARNOLD BENNETT—A PORTRAIT DONE AT HOME, TOGETHER WITH 170 LETTERS FROM A.B.," BY DOROTHY CHESTON BENNETT.

RACING PIGEONS BY RAIL

In view of the extensive traffic in racing pigeons now carried by British railways, the following orders of the old Midland Railway (recently reproduced in the *L.M.S. Magazine*) are of interest: Order No. 125 Derby, January 25, 1860

PIGEON FLYING

A practice has arisen of the public sending pigeons in baskets, from different stations upon this company's line, to other stations, with directions for the clerk at the receiving stations to let them loose upon arrival, or at some other time named, and then to return the empty baskets.

Clerks in charge, and other servants of the company, are instructed to decline complying with such directions and every hamper or other package containing pigeons must be very carefully examined when brought to be forwarded, and if it is directed for any of the company's employees to set them at liberty, the sender must be informed that our servants are not permitted to attend to any instructions as to releasing the birds, returning the baskets, &c. In case pigeons thus directed escape the notice of the sending station, the clerk at the receiving station must at once advise the sending station and the clerk at the latter must as soon as possible inform the sender that his instructions cannot be attended to.

Signed, W. L. NEWCOMBE,
General Manager.

Order No. 135 Derby, May 17, 1860

PIGEON FLYING

The provisions of Order No. 125 are hereby rescinded, except as regards pigeons intended to be forwarded on Sundays, when the order must still be acted upon.

Signed, J. ALLPORT,
General Manager.

It may be added that Mr. W. L. Newcombe, who became General Manager on October 1, 1857, was succeeded on April 4, 1860, by Mr. J. J. (afterwards Sir James) Allport. The latter had been General Manager for exactly four years between 1853 and 1857. He then went to Palmers Shipbuilding and Iron Company of Jarrow, but was recalled to the Midland Railway two years later.

Time was when the average railway station and yard in Canada left an impression of grime and supreme ugliness imprinted on the traveller's mind. Now each season sees an increasing number of flowers being distributed to beautify these formerly ugly spots. The Canadian National Railways this year distributed 200,000 flowering plants from the railway greenhouses to adorn stations and other property on their lines—a tribute to the aesthetic side of practical rail-roading which has developed in the last few years.—From "Canada's Weekly."

ACCIDENTS

What a fuss is made about railway accidents! Terrible indeed they are, when they occur. But when we read of the "worst accident in seven years" involving fourteen deaths, and when we learn that the total number of deaths from railway accidents in a year is under a hundred, do we forget that the motor car has been slaughtering its hundred a week for years? Whatever may be said of the Minister of Transport, he has at least done something to reduce the weekly tale of tragedy, and all the protests of motorists at the various restrictions imposed on them sound very thin and mean against the saving of even a single life in a week.—*The Rev. Ralph Gardner, Vicar of St. Mary's, South Benfleet, writing in his parish magazine.*

SQUARING THE CIRCLE

W.—"I thought the cylinders of railway engines were always round."

X.—"So they are."

W.—"But I was reading the other day about an engine that had square, or almost square, cylinders."

X.—"Oh! you mean equal, or approximately equal, bore and stroke?"

W.—"Oh that's it, is it?"

Y.—"Nothing without a parallel: what about the old colonel who rounded the square on a cycle every morning before breakfast?"

Z.—"Come to that, there's more than one square on the Inner Circle, isn't there?"

CROSSING INTERNATIONAL BOUNDARIES

Train and engine crews on the San Diego & Arizona cross the international boundary between the United States and Mexico eight times a day during the course of their regular runs. They operate on a turn-around basis, and, between El Centro, Cal., and San Diego, the line dips down into Mexico twice, making four border crossings each trip, or eight for the turn-around. A somewhat similar situation exists on the United States-Canadian border. On the



An invitation ticket from the collection of Mr. H. W. Bardsley. This railway was incorporated on July 16, 1855, and six years later was absorbed by the Great Northern Railway

run between Duluth and Winnipeg, on the D. & W.P.-Canadian National, trains leave the United States, run in Canada for several miles, return into U.S. territory, and then, finally, re-enter Canada. On this line, however, the crews do not make the turn-around run.—From the "Railway Age."

THE FIRST RAILWAY TESTIMONIAL?

What is believed to be the first railway "testimonial" to be presented was a silver cup bearing the following inscription:—

Presented to Mr. Matthew Bains, of Norton, many years Contractor on the Stockton & Darlington Railway, by his workmen, as a token of respect for his uniform kindness and liberality. February 16, 1838.

The Secretary of State for India, represented by the Forest Department of the Assam Government, has brought a suit for damages amounting to Rs. 2,500 against the Tezpur-Balipara Light Railway for killing an elephant belonging to the plaintiff. It is alleged that the defendant rashly and negligently drove a railway train over the animal near the Nelarani siding. The judge has reserved orders and has proceeded to the spot for an inquiry.

U.S.A. PATENT NO. 2,000,000

The two-millionth patent granted by the United States Patent Office since the beginning of the present series in 1836 was issued recently to Joseph Ledwinka, Chief Engineer of the Edward G. Budd Manufacturing Company, Philadelphia, Pa., to which company the patent is assigned. The patent, issued on an improvement for pneumatic tires for railroad cars, is not only the two-millionth granted by the patent office but the two hundred and forty-eighth award to Mr. Ledwinka, whose work during the last 36 years has had a marked influence upon the development of the modern automobile and streamlined train. He received his first patent in 1899 on a "means of propulsion of vehicles by electricity." It was No. 638,643.

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

ARGENTINA

Report of Government Railway Committee

The Special Railway Committee under the chairmanship of the Director-General of Railways (Engineer Manuel Garcia Torre) appointed by the Argentine Government in April last to draft the changes in the railway laws and regulations considered advisable in the light of the findings and recommendations of the Government Transport Committee (vide THE RAILWAY GAZETTE of May 10, 1935), has now presented its report to the Ministry of Public Works. The contents of the documents have not been made public, but it is understood that the committee has suggested considerable modifications in the existing regulations, and that a Bill embodying its proposals will be drawn up and submitted to Congress in due course.

Restrictions on Railway Telegraph Service. Government Decree to be Enforced

Despite strong protests not only by the railways but by the general public and in the press against the decree prohibiting the operation by the railways of public telegraphs at places where there are postal telegraph offices, the Government has announced its decision to enforce the decree in question as from October 15 next. This virtual monopoly of the national telegraph service will raise serious difficulties for commerce, the press and the general public, and at the same time threatens to deprive hundreds of railway telegraph clerks of their means of livelihood. By the terms of the decree, the Postmaster-General—at whose instigation the new law has been passed—will decide in what cases the new regulations are to be applied.

Silver Jubilee of a Central Argentine Train

Sunday, September 1, marked the twenty-fifth anniversary of the inauguration of the Buenos Aires-Rosario express known as the Rápido, the establishment of which by the Central Argentine Railway in 1910 initiated a new departure in Argentine railway operation. For a long time the company had aimed at establishing a fast daily express service that would cover the 303 km. (188 miles) between these two cities in shorter time than that taken by the ordinary passenger trains. The doubling of the line, improved signalling, and a stone-ballasted track made this possible, and on September 1, 1910, the Rápido made its first successful run between Buenos Aires and Rosario in—what was then the record time for the distance—4 hr. 55 min. With the

increase in the size and tractive power of the company's locomotives, this time has been gradually reduced to 4 hr., giving an average speed of 75 km. (47 m.) p.h., thus making the Rápido the fastest train in South America. The accelerated timetable, which came into force on December 1, 1934, was published in THE RAILWAY GAZETTE of March 29 last.

From the first the service proved very popular with the commercial community in Buenos Aires and Rosario as its fast running, punctuality, and convenient hours of departure and arrival enabled business men in both cities to make the double journey comfortably and expeditiously in a day, while allowing them ample time to transact their affairs without undue rush. In addition to comfortable first class saloon coaches, the train is also equipped with up-to-date dining and Pullman cars. Some two years ago, accommodation for second class passengers was included in the composition of the train, an innovation which has added to its popularity, while parcels are now carried as well as mails.

The company considered that an event such as the Silver Jubilee of the train should not be permitted to pass unnoticed, and on the date mentioned a special menu was prepared for the dining car in each direction, in addition to which champagne was served to give the passengers an opportunity to toast the continued success of the train.

UNITED STATES

Financial Results and Obligations

Congress has now re-enacted a railway pension act worded so as to overcome the objections of the Supreme Court, which found a previous pension bill unconstitutional. Competent legal authority seems to believe that a similar fate probably awaits the new measure, but if not, a further annual outlay by the railways beginning at £15,000,000 and increasing each year until it reaches, perhaps, £40,000,000, is in prospect.

In the first six months of the year, the railways had revenues of approximately £327,000,000, which was almost exactly the same as in the first half of 1934. Working expenses, however, increased almost 4 per cent., due primarily to the restoration of pre-depression wage scales on April 1, so that net railway operating income (before interest and rental payments) was only £38,900,000, as compared with £45,500,000 in the first half of last year. The rate of return on the property investment was 1.81 per cent. Scarcely more than half a dozen of the large railway systems are currently

earning any surplus for the ordinary shareholders. The mileage of railways which are either in outright bankruptcy or virtually so is 67,000, or 26 per cent. of the total of the country. If earnings continue at their present levels, it would seem that these totals might be considerably augmented before the end of the year. There is some hope, however, in the healthy revival now being shown by the heavy industries—notably steel and residential construction. Most observers expect that railway traffics within a few weeks may show a considerable improvement over last year.

INDIA

Rolling Stock Programme for 1936-37

As has already been mentioned in these columns, the Standing Finance Committee for Railways recently approved of an expenditure of Rs. 300 lakhs on rolling stock for State-owned railways during the year 1936-37: the following details of the programme are now available:—

	Capital Expenditure Rs. (lakhs)	Expenditure from Depreciation Fund Rs. (lakhs)	Total Expenditure Rs. (lakhs)
Locomotives ...	19	53	34
Boilers ...	7	33	40
Carriages ...	66	113	179
Wagons (excluding general service wagons) ...	19	28	47
Total	Rs. 73	227	300

It is proposed to purchase 14 broad, 37 metre, and 2 narrow gauge locomotives in 1936-37. The broad gauge locomotive programme includes the renewal of 13 steam engines and the addition of one electric passenger engine for the Great Indian Peninsula Railway, as the 24 electric locomotives now in use leave little margin for emergencies. With the exception of six new boilers required for the acceleration of repairs on the Eastern Bengal Railway, the expenditure proposed on boilers is wholly in respect of renewals of worn-out stock. A sum of Rs. 64 lakhs is proposed to be spent on upper class coaching stock, and Rs. 77 lakhs on lower class coaches. The balance of the sum provided for coaching stock is intended for the purchase of luggage, motor, parcel, fish, and other special vans. Provision has also been made for the replacement of 30 officers' inspection carriages.

When the Standard Finance Committee met in July last, the Railway Board had not reached a final decision in regard to the coming year's requirements of general service wagons. In 1934-35, the board contemplated the purchase of 4,250 general service wagons during the year 1935-36. This number was subsequently reduced by 500 when railway traffic began to decline early in 1935. The programme for 1936-37 has therefore, to be considered in rela-

tion to the traffic prospects of the future. With the data now available, the number of new wagons that will be required in 1936-37 has been estimated at 2,000. It is possible, however, that the present set-back in traffic is only temporary; a revival will necessitate a larger addition to the wagon stock. The Railway Board proposes to place its definite recommendations before the Standing Finance Committee in September and in the meantime it has decided to invite tenders from Indian and foreign manufacturers for the total wagon requirements estimated on the prospective improvement of traffic.

JAPAN

Floods

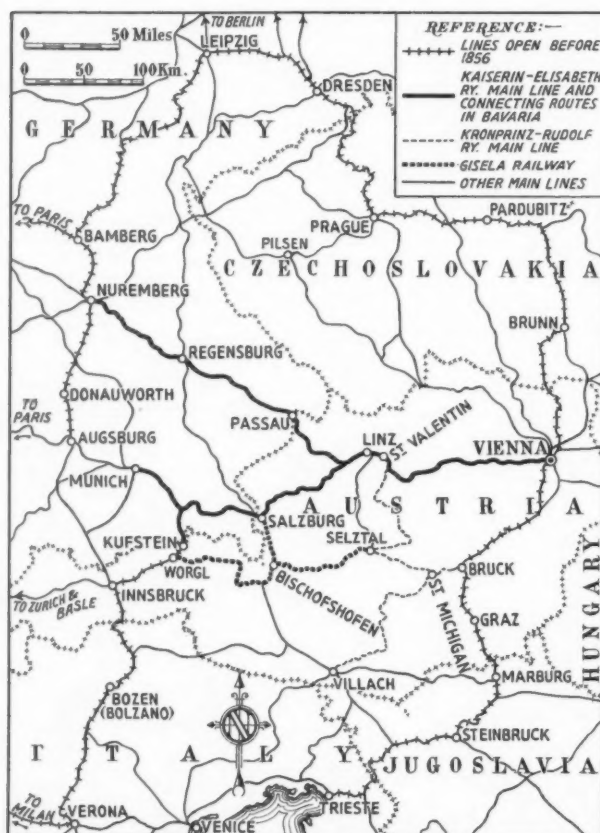
Heavy rains in the wake of particularly severe typhoons again caused traffic interruptions on the Tokaido main line on August 29, for the third time this summer. For two days high waves from Suruga Bay constantly attacked the double track Kikugawa bridge between Kambara and Yui, two intermediate stations in the Numazu-Shizoka section of the main line, and, as a safety measure, single line working was resorted to on the up line, or lee side, on August 27. During the afternoon of the 29th the

embankment east of the bridge collapsed and all traffic was interrupted. Considerable congestion resulted at the stations on both sides of the break, among the trains which were held up being the Fuji, the Tokyo-Shimonoseki express. Passengers were taken by buses, motorcars and lorries between Kambara and Yui stations and the laying of a single track round the breach was started at once, under extremely unfavourable weather conditions. On August 30, at 6 p.m. traffic was resumed on the temporary single track and a second line was ready next morning. A speed restriction of 10 km.p.h. was brought into force. It was expected to take at least two weeks before normal traffic could be resumed.

AUSTRIA

The Kaiserin Elisabeth Bahn

Seventy-five years ago, on August 12, 1860, railway communication was completed between Vienna and Munich with the ceremonial opening of the last section, namely, between Salzburg and Traunstein, by the Emperor Joseph I of Austria and King Maximilian II of Bavaria. This line was the principal portion of the Kaiserin Elisabeth Bahn, from Vienna to Salzburg, with a branch to Passau, on the route to Nuremberg. The importance of this line as a link in the trunk railway system of central Europe is indicated on the accompanying sketch map. [In an editorial article on page 481 we trace briefly the development of railway communication along this important medieval trade route. — Ed., R.G.]



Sketch map of the Kaiserin Elisabeth Railway, Austria

the companies from the public. A similar tax, with some variations in amount, is due on transport by road, but, especially on merchandise carried on motor lorries, is universally evaded, as is the tax on all road users for the Road Maintenance Fund. The consequence is that pirate lorries divert traffic from the railways.

This obvious abuse has at last led to the promulgation by the Government of a Decree dated August 29, under which all lorries engaged in the transport of merchandise will be called upon to declare the routes upon which they intend to work, and in addition to the ordinary license and insurance certificates, will be required to exhibit in a prominent position a certificate of having paid in advance the quarterly proportion of the transport and road maintenance taxes for the year. These taxes will be commuted on the basis of 2½ centimos per ton per kilometre for the transport tax and 2 centimos for road maintenance, and the weight will be calculated on two thirds of the sum of the certified gross and tare weights of the lorry, the distance factor being computed on the basis of one daily journey over the route for which the vehicle is licensed to trade. For any failure to comply with this new regulation a fine of 500 pesetas (£14) will be imposed for the first offence, double for the second, and for the third, deprivation of licence for one year.

It is considered that this regulation and close inspection by the inspectors recently nominated by the railways and accredited by the Ministry of Finance, will prevent the abuse.

New Legislation

The Madrid Gazette of August 2 publishes the new law, which recently had such a rough passage through the Cortes. The law, which is dated August 1, provides first of all for the issue of bonds by those railway companies which are not in arrears with the payment of their debenture interest, up to a total of fifty millions of pesetas (£1,400,000). The bonds will be backed by the guarantee of the State. This will favour only the two principal companies, the Northern and the Madrid Saragosa and Alicante (for whom, indeed, the law was intended) and will not help the smaller companies, or even the Andaluces, none of which is paying debenture interest regularly. As was reported in THE RAILWAY GAZETTE of March 29 last, the two big companies then asked for authority to issue debentures for 200 millions of pesetas with the guarantee of the State, seeing that the life remaining in their concessions is insufficient to provide for a reasonable rate of repayment. In June the Minister of Public Works tabled a Bill in Congress to provide for such an issue (see THE RAILWAY GAZETTE of June 21, 1935), but it met with great opposition in the Cortes, and the original draft had finally to be withdrawn and re-

SPAIN

Road Transport

In Spain there is a State tax on all transport. On the railways the tax, amounting to 25 per cent. on the price of tickets (10 per cent. on reduced fares), and 5 per cent. on the carriage of merchandise, is added to the railway charges and collected by

drafted in committee, in more or less the form it has now become law.

At the same time, advantage has been taken of the passage of this law to introduce a clause (Article 5) which in effect repeals some of the restrictions placed on tariff changes by the Decree of December 26, 1918, and the law of May 28, 1934, so that the Minister is now authorised to permit modifications in special tariffs—that is, tariffs within the basic maxima of the concessions—a measure which, it is hoped, will confer a greater flexibility on the adjustment of charges to meet present-day conditions. Another new clause (Article 3) refers to a liquidation of the "mutual credits" existing between the State and the railways. The State owes a considerable amount for military and other transports, some date back to the military campaigns of the last century, but it remains to be seen what the Government experts will consider to be credits.

Commission to Draft New Bill

Lastly, and by no means least, the new law provides, in Article 6, that the Government shall present to the Cortes before November 1, a new Railway Bill, which shall establish the definite régime of relations between the State and the companies, to which end the Minister of Public Works is to appoint a commission, formed of representatives of the State, the railways and railway users, with also a representative of the employees. This commission is to draw up a new Bill which, if and when it passes Congress, will replace the Statute of 1924, the legality of which has never really been clearly defined (see THE RAILWAY GAZETTE of June 21 on this subject). Meanwhile, many of the smaller railways, suffering from the effects of motor competition in the shape of reduced receipts and with their working expenses greatly increased by recent social legislation, have notified the Government that, after the month of August, they will be unable to continue paying the increases in pay conceded by order of the Government in 1920, to meet which the Government advanced the necessary extra funds until the end of 1928, when the advances ceased. To counter this announcement the National Railwaymen's Union announces that their members will claim the payment of any wages so deferred plus the interest provided for in Article 87 of the Labour Contract Law (Decree of November 21, 1931) at the rate of *five per cent. per week*. This extraordinary high rate of interest, fixed by legislation passed in the first year of the Republic, would appear to be openly in conflict with the law against usury. It remains to be seen whether it will so be considered.

The Santander-Mediterranean Railway Bribery Case

It is satisfactory to note that the British interests concerned in the construction of this railway were at no

time involved in the *cause célèbre*, upon which the decision of the Supreme Court has just been published in Madrid. The case as brought by the then new Republican Government in 1931 against numerous well-known individuals, accused them of accepting bribes in connection with the preliminaries to the construction of the line during the Military Directorate. The case was instituted to show that the new Government intended to expose and not repeat the abuses of its predecessor.

SOUTH AFRICA

Rockets Used in Electrification

One of the difficulties connected with the electrification of the Natal main line at Shongweni was overcome in a unique manner. Over one stretch of country electric cables had to be carried from the heights above Delville Wood tunnel to the railway track 1,500 feet below, the country being thickly wooded, broken and particularly steep.

The harbour rocket life-saving apparatus was brought into commission, by which means hemp lines were fired by double discharge rockets from each side of the tunnel. The "shots" were successfully placed, landing within a few feet of the objective. The cables were then secured and hauled across. The length of one of the "shots" was 1,500 feet.

CHINA

Railway Exhibitions

The 1935 exhibition, held at Tsingtao, of products from various centres and areas served by the different railways has recently closed. The Ministry of Railways has decided to hold the 1936 exhibition at Sian. Each railway has a section in this annual exhibition, and there is also a separate market where purchases may be made. Large attendances are attracted and considerable trading takes place, whilst the publicity value is great.

Proposed North-South Main Line

Another new trunk line is taking shape in the form of a connection between the Fukien port, Foochow, and the existing railway system of China, and primarily the Chekiang-Kiangsi Railway. The first 120-150 miles of line are now being surveyed and the junction point with the Chekiang-Kiangsi line will be at Shangjiao, or Kwangsinfu. The objective of the present survey is Yenping in Northern Fukien, and field-work is already in hand. Plans and estimates are expected to be ready in time to allow construction to start early in 1936. Meanwhile a rough estimate places the cost of the whole line at \$18,000,000, and it is proposed to finance the project by a loan advanced by Chinese banking interests secured on a \$30,000,000

bond issue by the Nanking Government. The new line will open up fresh country and give it a coastal outlet. The intention is eventually to extend this line northwards to Wuhu, thus giving a direct line of communication between Nanking and the south-east coast at Foochow.

Further Tating-Puchow Railways Extensions

Some 70 miles of the northern extension of the T-P.R., from Taiyuan to Yuanping, and a further section of the southern extension to Howma were opened to traffic on August 1. Military labour is being employed upon this construction work. The total length of line now open between Yuanping and Howma via Taiyuan is about 200 miles.

TANGANYIKA

Financial and Statistical Returns

The approximate revenue earnings of the Tanganyika Government Railways for the first half of 1935 amounted to £258,928, as compared with £209,889 in the corresponding period, January-June, in 1934, an increase of £49,039. As the budget estimate for the period was £220,000, there was an improvement upon this figure of £38,928. During the same period the following were the import and export tonnages over the Central and Tanga lines as compared with those for the first half of 1934:—

Line	Jan.- June, 1934	Jan. June, 1935	Inc. or Dec.
	Tons	Tons	Tons
IMPORTS—			
Central ...	26,846	40,232	+13,386
Tanga ...	10,237	13,111	+ 2,874
EXPORTS—			
Central ...	25,415	38,334	+12,919
Tanga ...	35,019	35,653	+ 634

VICTORIA

Modification of S Class Locomotives

As already reported, the S class express passenger engines have recently had their front ends modified considerably. The success that has attended the modification is proved in striking manner by dynamometer car trials before and after alteration. In trials prior to modification S 303 developed a maximum d.b. h.p. of 1,560 which was recorded at 30 m.p.h. After being altered this same engine developed 1,920 d.b.h.p. at that speed, but at higher speeds over 2,000 d.b.h.p. was recorded, and the maintained h.p. at 38 m.p.h. was 1,970. It is significant that the trial run was made between Melbourne and Albury with a load of 500 tons—which is above the maximum for the limited expresses—and with that train load 70 m.p.h. was maintained with ease on the level.

L.N.E.R. PACIFIC PERFORMANCE

MODERN standards of locomotive performance on the East Coast Route are well illustrated by a run on the 1.20 p.m. down express, probably the hardest daily task set to the Gresley Pacifics.

The engine, No. 4476, was one of the original batch built in 1923, carrying a boiler pressure of 180 lb. per sq. in., but has since been fitted with long valve travel like the later Pacifics. The load was the usual one of 15 vehicles weighing 515 tons. For the first 100 miles a strong westerly wind was a serious handicap.

L.N.E.R. 1.20 P.M. KING'S CROSS-NEWCASTLE
Load : 15 vehicles, 483 tons tare, 515 tons full.
Engine : 4-6-2 No. 4476 *Royal Lancer*

Miles		Schedule	m. s.	m.p.h.
0-0	King's Cross ...	0	0 00	†
2-6	Finsbury Park ...		6 33	
5-0	Wood Green ...		10 09	51
12-7	Potters Bar ...		21 05	40
17-7	Hatfield ...	25	26 33	69½
31-9	Hitchin ...	39	40 30	79
51-7	St. Neots ...		57 10	61½
55-8	Offord Home Signal ...	arr.	62 07	
		dep.	64 10	
58-9	Huntingdon ...	62	70 54	
69-4	Holme ...		82 12	73
76-4	Peterborough ...	80	89 20	15*
88-6	Essendine ...		104 15	62½
100-1	Stoke Box ...		117 53	45
105-5	Grantham ...	114	123 50	
0-0	Barkston ...		0 00	
4-2	Newark ...	15	6 29	60
14-6	Crow Park ...		15 23	75
21-9	Markham Box ...		21 49	66
28-2	Retford ...	35	28 40	50
33-1	Doncaster ...	53	33 32	68
50-5	Shaftolme Junction ...	58	50 28	60
54-7	Selby ...	74	54 38	64½
68-9			68 40	25*
			signals	
82-7	York ...	92	87 25	
0-0	York ...	0	0 00	†
5-5	Benningborough ...		8 30	57
11-2	Alne ...		13 58	66½
18-0	Sessay ...		20 22	62
22-2	Thirsk ...	25	24 23	67
30-0	Northallerton ...	33	31 45	61
		p.w.r.	severe	25
38-9	Eryholme Junction ...		43 32	54½
			signals	
44-1	Darlington ...	48	50 40	
0-0	Aycliffe ...	0	0 00	
5-4	Ferryhill ...		9 47	63 max.
12-9	Durham ...		18 15	27*
22-0		28	29 02	
			pitfall	
27-8	Chester-le-Street ...		36 15	64½ max.
			pitfall	
33-5	Low Fell ...		42 10	
36-0	Newcastle ...	47	46 55	

* Service slacks—

Net times :—	Minutes
King's Cross-Grantham ...	114½
Grantham-York ...	87
York-Darlington ...	46
Darlington-Newcastle ...	45½

† Maximum and minimum by chronograph at or near stations.

Starting out of King's Cross on 65 per cent. cut-off, the gear was linked up, step by step, to 47 per cent. at Belle Isle; at the top of Holloway bank the cut-off was reduced to 28 per cent., and at Haringay to 25. At Oakleigh Park cut-off was advanced to 30 per cent., the regulator all the time being full open. The boiler pressure of 175-177 lb. per sq. in. was reduced only to 160-162 in the steam chest.

Beyond Potters Bar, the regulator opening was varied to suit the gradients, the steam chest pressure varying accordingly. The lowest recorded was 125 lb. per sq. in. at Hitchin where the regulator was only about half open.

The boiler pressure was maintained unvaryingly at 170-177 lb. per sq. in. throughout the whole run to Newcastle.

From Peterborough to Grantham full regulator was used and cut-off advanced to 28 per cent. at Little Bytham, and on the 1 in 178 to Stoke summit the minimum speed was 45 m.p.h. Steam chest pressure was 160 lb. per sq. in. From Grantham to York the regulator was between half and three quarters open and the steam chest pressure varied from 120 to 140 lb. per sq. in. Only 1½ miles from the York start cut-off was back to 25 per cent. Full regulator was used as far as Alne, at which point it was reduced to about three quarters open and the steam chest pressure dropped from 160 to 140 lb. per sq. in. The delay of 9½ minutes due to the signal stop at Offord (see log) was recovered by the engine, which was in charge of Driver A. J. Taylor and Fireman J. Luty of King's Cross shed.

The East Coast Route north of Edinburgh, with its severe gradients and numerous service slacks, demands work of a different character altogether. A recent run on the up Aberdonian is a good example of the standard required. The engine was one of the latest Super-Pacifics, No. 2500, *Windsor Lad*.

The following is a log of the journey:—

L.N.E.R. 9.27 P.M. DUNDEE-EDINBURGH
Load : 414 tons tare, 440 tons full.
Engine : Class A3 4-6-2 No. 2500 *Windsor Lad*

Miles		Schedule	m. s.	m.p.h.
0-0	Dundee ...	0	0 00	
2-7	Tay Bridge, South Junction ...	8	7 44	
8-3	Leuchars Junction ...	14	13 53	63½*
20-1	Ladybank Junction ...	29	26 28	62½
24-3	Lochmuir Box ...		31 52	31½
			p.w.s.	
28-5	Thornton Junction ...	41	37 50	15
31-2	Dysart ...		43 35	27½†
			p.w.s.	15
33-3	Kirkcaldy ...		46 45	
36-5	Kinghorn ...		51 02	25½
39-1	Burntisland ...	55	55 10	25½
			—	44
43-1	Dalgetty Box ...		62 05	31½
46-2	Inverkeithing ...	65	66 03	25½
47-9	North Queensferry ...		70 35	17½
49-7	Dalmeny ...	73	74 20	
52-7	Turnhouse ...		77 33	69
58-0	Haymarket ...	82	82 41	
59-2	Edinburgh (Waverley) ...	85	85 43	

* Maximum prior to 55 m.p.h. slack through station.

† At Kingskettle ; speed reduced to 50 through junction.

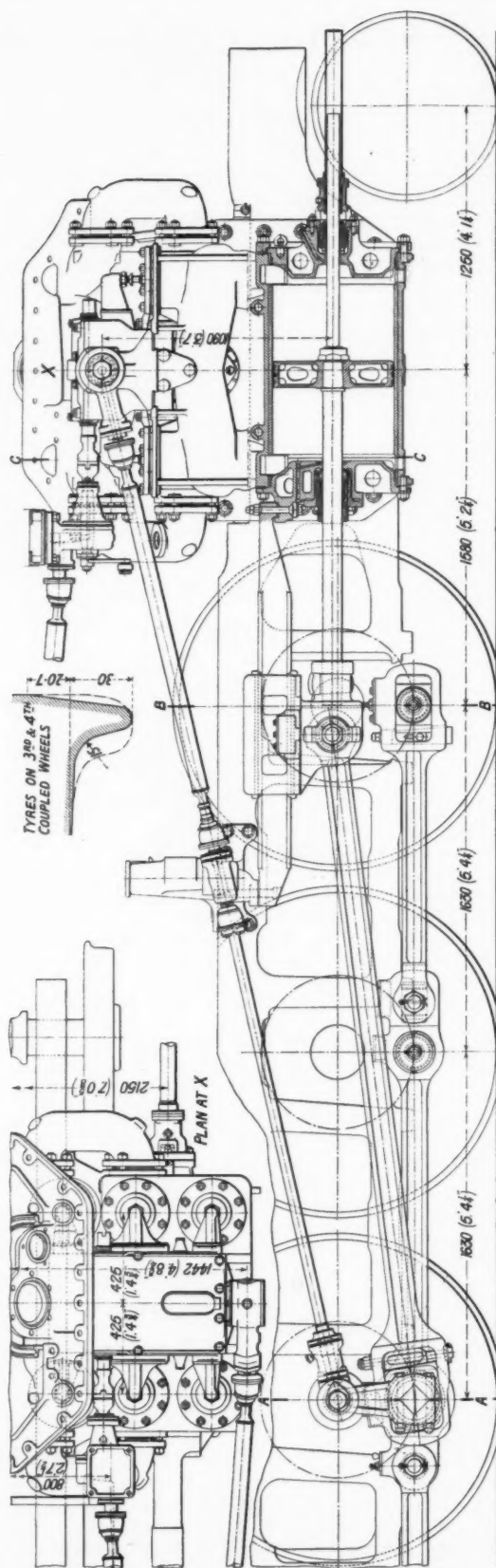
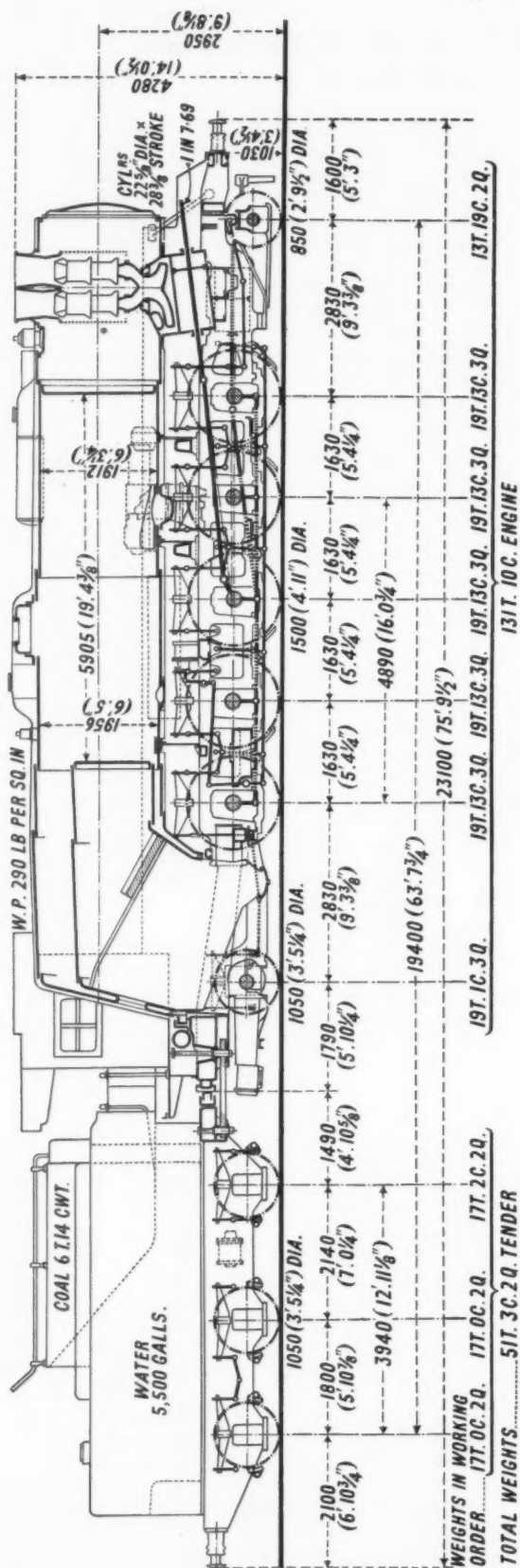
‡ At Mile Post 29. Net time, 80½ minutes.

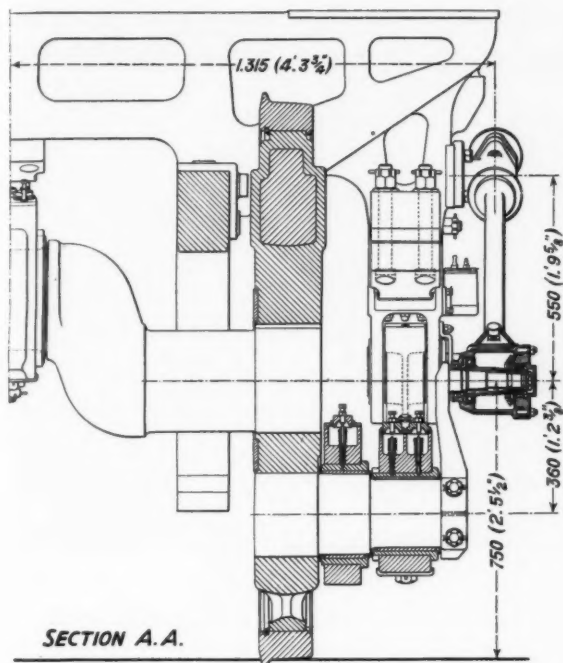
§ Service slack.

Except on the steep descents where speed has to be kept at a strictly moderate figure, full regulator was used throughout and with boiler pressure varying between 200 and 220 lb. per sq. in., the steam chest pressure was often as high as 205. Starting out of Dundee up the 1 in 66-74-114 rise on to the Tay Bridge the cut-off was 40 per cent., but then no more than 20 per cent. sufficed to maintain an average speed of 57-7 m.p.h. over the undulating stretch from St. Fort to Ladybank Junction. Up the 3½ mile climb at 1 in 111-95-105 to Lochmuir, 25 per cent. was used.

Beyond Burntisland 30 per cent. cut-off was used up the 2½ miles at 1 in 100 to Dalgetty. On the worst bank of all, the 2 miles at 1 in 70 up to the Forth Bridge which succeeds the 25 m.p.h. slack through Inverkeithing, 40 per cent. cut-off was used. Full regulator and 20 per cent. produced a fast finish into Edinburgh.

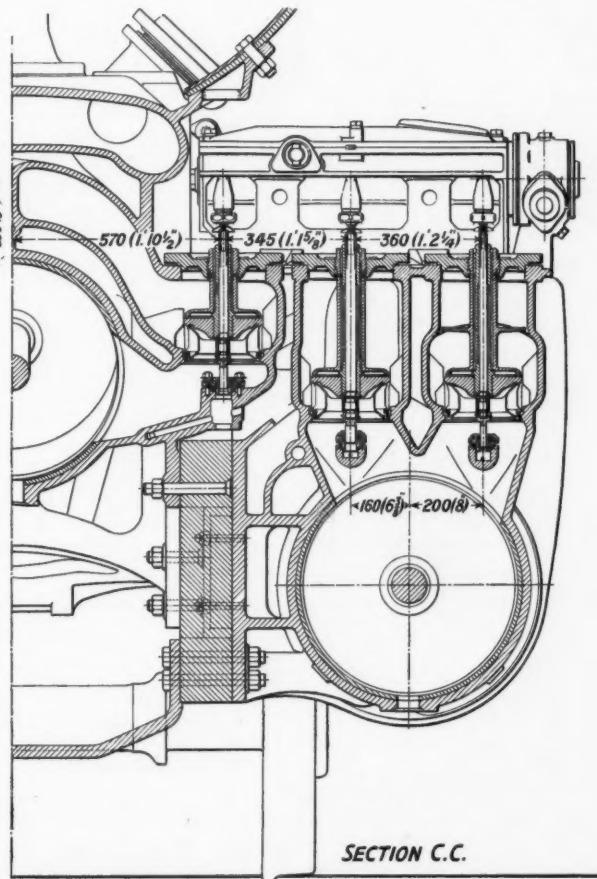
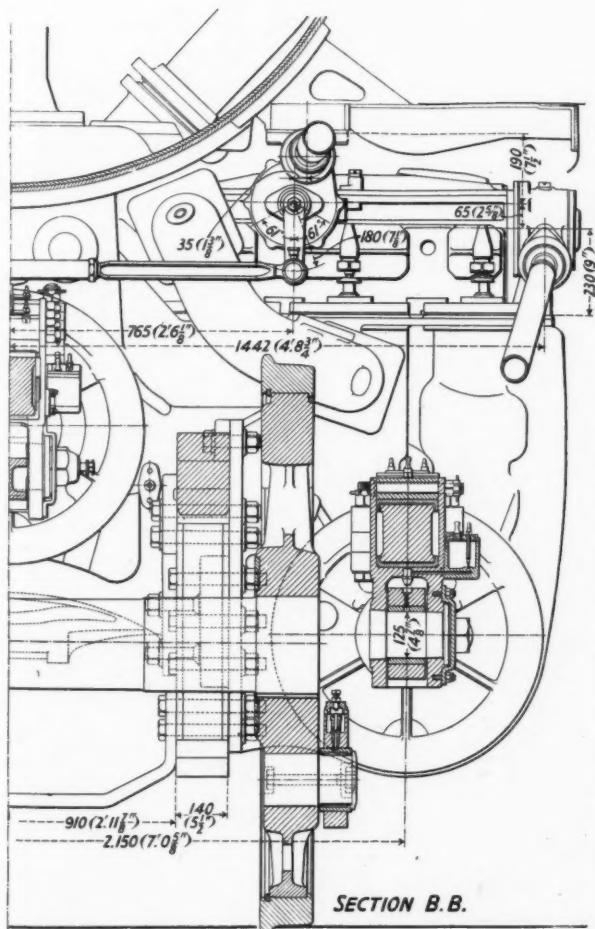
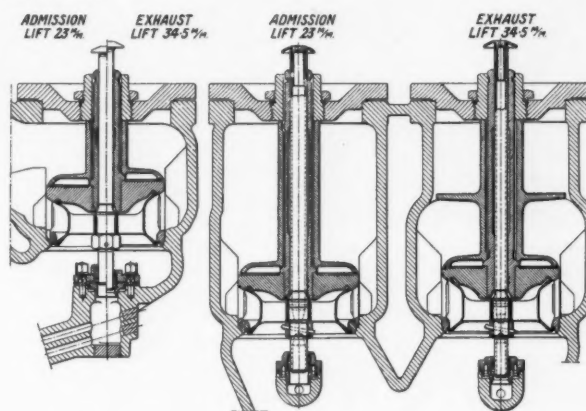
The net time of 80½ min. showed a net gain of 4½ min. on schedule. The engine was manned by Driver Douglas and Fireman Hood of Haymarket shed.





the booster, it is expected that it will haul a load of 1,700 metric tons (1,673 tons) at a speed of 20/24 kilometres (14.9 miles) per hour, over gradients of 11 mm. per metre (1 in 91).

It will thus be seen that the work to be demanded of the new locomotive is of a heavy character and this it should be well capable of performing, as will be appreciated from a perusal of the proportional and other characteristics enumerated above. With a boiler pressure of 290 lb. per sq. in. grate area 53.8 sq. ft., adhesion weight close upon 100 tons, distributed over ten coupled wheels, and mean theoretical tractive effort without booster, of 107,075 lb. the engine is well adapted in every way for the purpose in hand.



Cross-sectional drawings showing details of Caprotti valves and gearing

PROGRESS IN WELDING LARGE RAILWAY BRIDGES

The bridge carrying the German State Railway over the strait between Stralsund and the isle of Rügen is the largest plate girder bridge yet built by welding. It represents important advances in welding practice and in the testing of welds

By Dipl.-Ing. O. BONDY, M.I.Struct.E., V.D.I.

THE tendency to regard the welding of steel structures as a specialised and well-defined field of engineering is one to be opposed. The rapid progress achieved during recent years would have been impossible without close co-operation between specialists in many different subjects and the latest large welded bridge is a case in point. Since the author last wrote in these columns about the electric welding of railway bridges*, the bridge carrying the German State Railway over the sea between Stralsund and the island of Rügen has been nearly completed, and in every respect, from raw materials to finished structure, it represents important advances in practice. Comparison between this and earlier welded bridges shows the rapid progress that has been achieved and indicates that the development is still far from complete.

New Rolled Sections

As a first example of the innovations resulting from the progress in welding practice, reference may be made to new rolled sections for the flanges of welded plate girders. Development began in 1929 with the use of web plate, flange plates and angles as employed in riveted plate girders. These components were quite uneconomic for welded structures and, as early as 1930, a railway bridge was built with plate girders consisting of flanges welded directly to the web. During the following years several intermediate constructions were tried, including plate girders built up by using rolled T-irons or half broad-flange girders as flanges, with a thinner web plate between.

In 1931, however, the so-called Nasenprofil or bossed and grooved rolled-section was produced for use in welded structures. The form and dimensions of sections of this type have already been described by the author†. By the end of the fourth year of their production (1934) about 3,300 tons of these special sections had been delivered,

and they are now used excessively for welded railway and road bridges. When building girders by this means, it is only necessary to insert the web in the grooves of the bossed flange plates and make four fillet welds. In any case, it is a relatively simple matter to effect these welds, and generally the operation can be carried out by an auto-

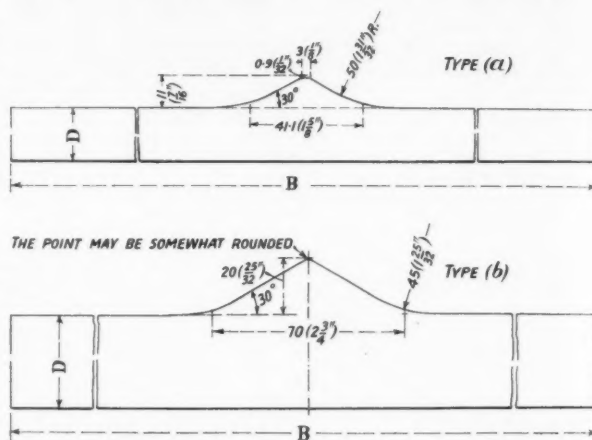


Fig. 1—Triangular-boss rolled sections for use in welded structures (see Table 1 for dimensions)

matic welding machine. In order, presumably, to compete with other sections mentioned below, the Dortmund Union concern recently introduced a new rolled section with a considerably more protuberant grooved boss, permitting a better rounding between web, weld and flange. This section may almost be regarded as a transitional form between the original grooved-boss section and the triangular-boss Wulstprofil illustrated in Fig. 1.

The Wulstprofil (literally bulge-profile) is a rolled section introduced by the Peiner Walzwerk with a boss of slightly truncated triangular section curving smoothly into the parallel portions of the flange as shown in the drawings. It is normally available at present in the sizes mentioned in Table 1, but greater lengths than 35 metres (114 ft. 10 in.) and smaller thicknesses than stated can be supplied if required, subject to the limits of weight and without guarantee of straightness.

* THE RAILWAY ENGINEER, September, 1934.

† THE RAILWAY ENGINEER, September, 1934, page 280.

TABLE I.—SIZES OF TRIANGULAR-BOSS ROLLED SECTIONS FOR USE IN WELDED STRUCTURES

Dimensions (see Fig. 1)				Maximum Length.		Type of Section (Fig. 1)	Weight of boss	
Metric		British (approx.)					Kg. per Metre run	Lb. per Ft. run
B	D	B	D					
mm.	mm.	In.	In.	Metres	Ft.			
250	15—19	9 $\frac{1}{2}$	1 $\frac{1}{2}$ —3 $\frac{3}{16}$	25—22	82—72 $\frac{1}{2}$	a	2.3	1.55
250—290	20—90	9 $\frac{1}{2}$ —11 $\frac{7}{16}$	1 $\frac{1}{2}$ —3 $\frac{9}{16}$	(approx.)	35*	a	2.3	1.55
300—400	20—90	11 $\frac{13}{16}$ —15 $\frac{1}{2}$	1 $\frac{1}{2}$ —3 $\frac{9}{16}$			b	5.6	3.76
400—600	30—90	15 $\frac{1}{2}$ —23 $\frac{1}{2}$	1 $\frac{1}{2}$ —3 $\frac{9}{16}$			b	5.6	3.76
600—800	40—90	23 $\frac{1}{2}$ —31 $\frac{1}{2}$	1 $\frac{1}{2}$ —3 $\frac{9}{16}$			b	5.6	3.76
800—1,000	50—90	31 $\frac{1}{2}$ —39 $\frac{1}{2}$	1 $\frac{1}{2}$ —3 $\frac{9}{16}$			b	5.6	3.76

* Normally subject to maximum weight 10 m. tons (9 tons 17 cwt.), which is, however, increased as required



Fig. 2—Triangular-boss flange plates 53 metres (173 ft. 10 $\frac{5}{8}$ in.) in length, rolled by the Peiner Walzwerk for the Rügendamm bridge

These sections are at present the most popular type for the construction of long-span bridges by welding. They are the outcome of prolonged experience in the fatigue testing of welded girders, and they embody the principle which emerges from all fatigue tests, however different their individual results, viz : concentrations of stress must be avoided, and transitions from one structural component to another must therefore be rounded as thoroughly as possible. This principle is well-fulfilled by the Peiner Walzwerk triangular-boss flange plate and its welded connection to the web.

The Rügendamm Bridge

The general arrangement and spans of the Rügendamm

bridge are shown in Fig. 4. The welded plate girders are built up from 540 mm. \times 40 mm. (21 $\frac{1}{4}$ in. \times 1 $\frac{5}{8}$ in.) triangular-boss plates and webs 3,600 mm. (11 ft. 9 $\frac{3}{4}$ in.) deep \times 15 mm. ($\frac{1}{2}$ in.) thick, as shown in Fig. 5. The flange plates for the main spans are 53 m. (173 ft. 10 $\frac{5}{8}$ in.) in length, rolled in one piece, a remarkable achievement which eliminates welding in the flanges. A number of these flange plates are shown in the accompanying photographs, Fig. 2 showing them stacked in the Peine rolling mill, and Fig. 3 illustrating the method of supporting them on a special truck for railway transport.

The girders were built up at the bridge works by assembling the flanges and web plate in circular clamps, which were then turned on rollers as required to bring



Fig. 3—Flange plates for the Rügendamm bridge leaving the Peine rolling mill

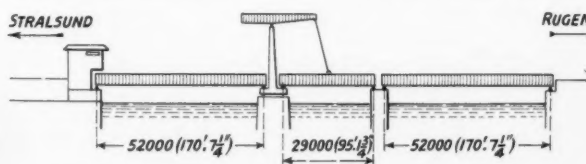


Fig. 4 (above)—General arrangement of the Rügendamm bridge, comprising two fixed spans and a central lifting span

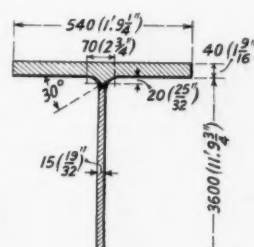


Fig. 5 (right)—Dimensions of welded main girders for the Rügendamm bridge

the welds successively into the most convenient position, i.e., horizontal.* The finished main girders, each 52 m. (170 ft. 7 $\frac{1}{4}$ in.) in length, weighing about 81 metric tons (79 tons 14 cwt.), were carried singly to Stralsund on two special trucks, transferred from rail to ship by ship cranes,

* See also G. Schaper, *Die Bautechnik*, February 8, 1935.

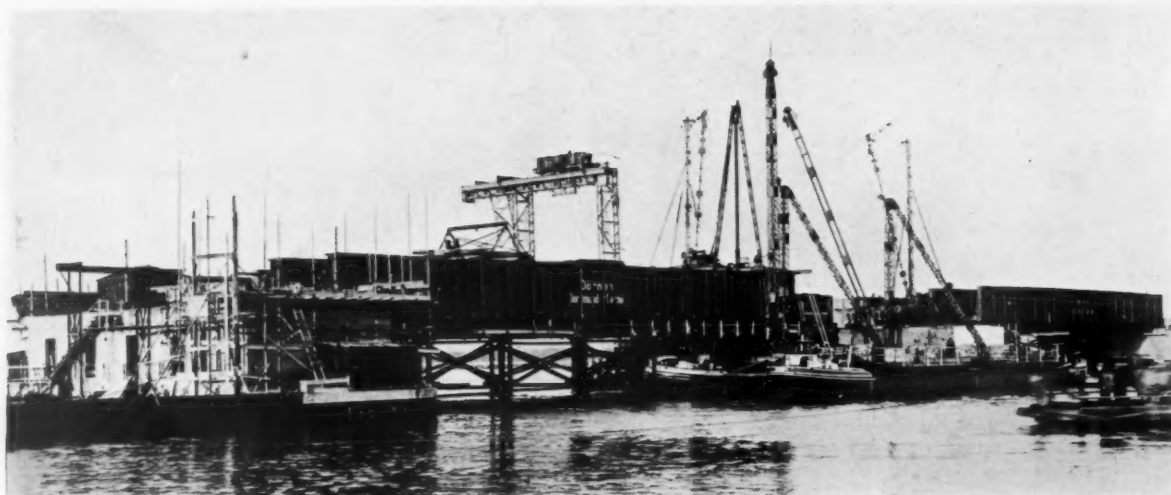


Fig. 6—Main spans of Rügendamm bridge lowered into position

and then floated to the site and placed on their respective supports.

The side elevation of the Rügendamm bridge is shown diagrammatically in Fig. 4. The complete structure comprises a single-track railway bridge and, alongside on the same supports, a road bridge as shown by Fig. 8. The two main spans are shown in position in Fig. 6, with the centre span for the lifting section still open. A view looking along the railway bridge in course of erection is reproduced in Fig. 7, which shows clearly the substantial nature of the connection between the cross girders and the heavily stiffened main girders.

The structural details of this bridge are in many respects remarkable. The reason for the use of the triangular-boss flange plates is evident from Fig. 5, which shows that—although the assembly and the central clamping of the web are certainly more difficult than where grooved-boss flanges are used—the rounded form of the completed weld is a decisive technical advantage. The small thickness of the web compared with the flanges is another noticeable feature of Fig. 5. Actually, the web is dimensioned strictly in accordance with the stress calculations, and

the fact that this is possible in welded girders often results in substantial savings where the necessary web-thickness is smaller than available in rolled sections.

Inspection of Welds

The testing of welds is a matter of more than usual importance where large bridge structures are concerned. Tensile, bending and impact tests can be applied, in accordance with well-defined rules, to the continual supervision of welding in workshop and on site. Such tests, however, are necessarily applied to specimens and not to the actual joints which it is proposed to use in service. On the other hand, examination by X-rays reveals the inner structure of welds without in any way injuring the metal. The equipment and technique of X-ray examination have now been brought to a high degree of perfection, and although the first cost of the requisite apparatus is considerable, its use is rapidly extending. Compared with all methods of mechanical testing, X-ray examination promotes safety to an extent which cannot be expressed in terms of money. In recognition of this fact, X-ray equipment is essential to modern railway engineering practice



Fig. 7—Rügendamm bridge being built

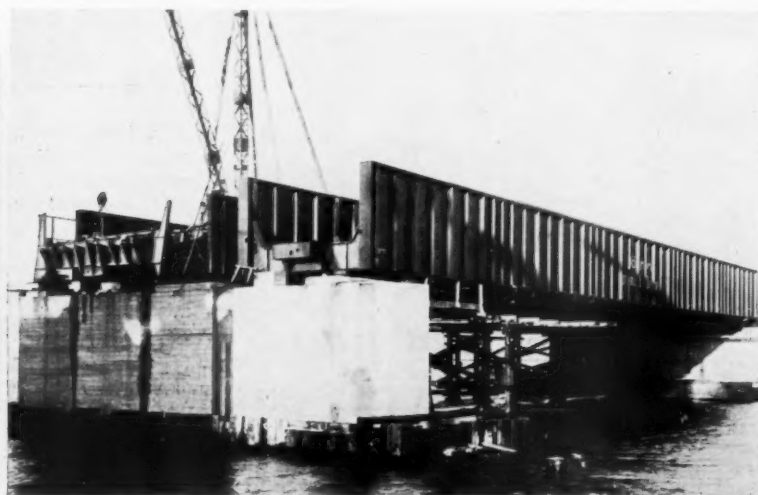


Fig. 8—Welded 52-metre span with road bridge behind

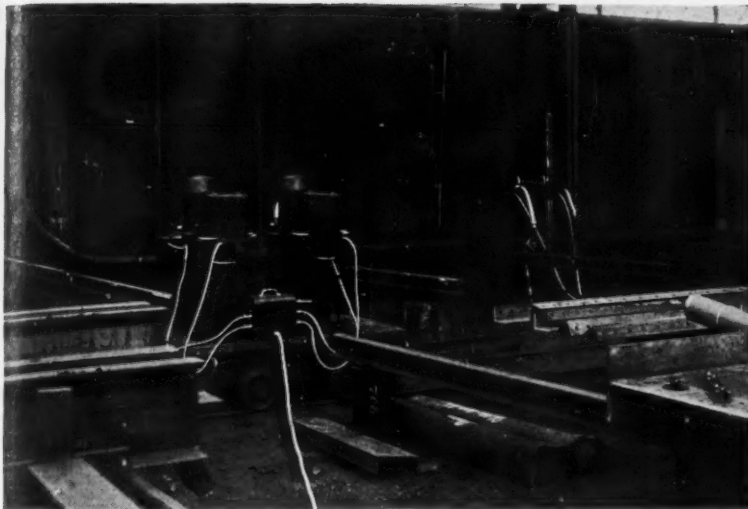


Fig. 9—Workshop X-ray inspection of welded plate girder

and its applications extend not merely to the examination of steel bridges, but also to the inspection of reinforced concrete structures, welded vehicles, welded rail joints, and so on. Bearing in mind that such examinations are not restricted to equipment under construction or newly completed, but can be conducted as often as necessary on equipment in service, it will be appreciated that the actual cost of individual inspections over a term of years bears no relation to the value of the information obtained and the insurance effected against mechanical failure.

The general arrangement of an Isolux equipment for the X-ray examination of welds is shown in Fig. 9. In view of the high working voltage (up to 250,000 V.), the cables are specially insulated, and certain safety regulations must be strictly observed.

Web Welds

One of the latest methods of welding lengths of web plate in long-span bridges is by means of the swallowtail joint, which increases the length of weld, reduces the stress on the weld metal, and avoids the use of straps covering the joints. An example of such a joint is illustrated in Fig. 10, which shows one of the web plates of the welded plate-girder bridge over the Ruhr at Wetter, built in 1933. Details of this joint are given in Fig. 11, which shows also the position of edge-welded stiffening plates A_1 , A_2 fitted after the web was welded between the flanges.

It is, of course, necessary to take all precautions to ensure that the welds of the dovetail joint are completed satisfactorily before the web

is passed for assembly in the girder. In the present instance, the external appearance of the weld at the junction of three seams (Fig. 12) gave rise to some uneasiness, but X-ray examination showed that the joint was quite sound.

Arrangements for the X-ray photographing of a complete dovetail weld are shown in Fig. 13. Formerly, many individual exposures would have been required for the complete examination of such a system of welded joints, but the general-exposure method* now enables a large area to be examined at once, and the requisite preparations can be completed in about 10 minutes. A considerable saving of time is effected by the use of magnetic clamps which hold the wrapped films securely, even on perpendicular or overhanging surfaces, instead of employing lead strips, screw clamps, timber struts and wedges as illustrated in Fig. 14.

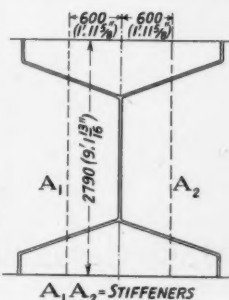
By using two X-ray tubes fed from the same supply, a total length of 16 metres (52½ ft.) of welds in the web mentioned above was examined by a single exposure. Such a possibility obviously accelerates and cheapens the process of testing welds by X-ray examination and it is reasonable to suppose that X-ray equipment with voltages up to 250,000 V. will gradually be adopted as widely in workshop practice as welding equipment itself.

Welding technology and the technique of X-ray examination have, in fact, advanced side by side during recent years, each contributing to the progress of the other. Much of the distrust with which the welding of large bridges is still regarded, can be removed by the systematic application of X-ray examination. The testing of welded railway bridges by X-ray examination is already standard practice in Germany. The German State Railway Company has X-ray testing cars in regular use,

* W. Rostek, *Glaser's Annalen*, November 15, 1934.

Fig. 10 (right)—Weld in web plate 2,790 mm. (9 ft. 2 in.) deep, for Ruhr bridge at Wetter, ready for X-ray examination

Fig. 11 (below)—Welded web plate for Ruhr bridge at Wetter, showing position of stiffeners



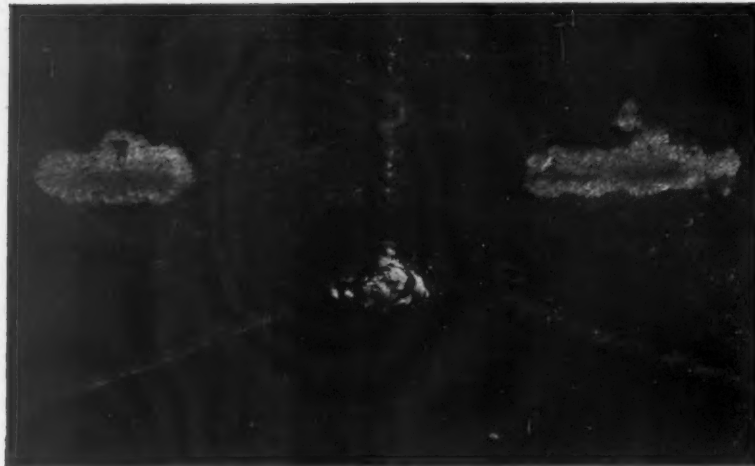


Fig. 12—Junction of three welds in web plate

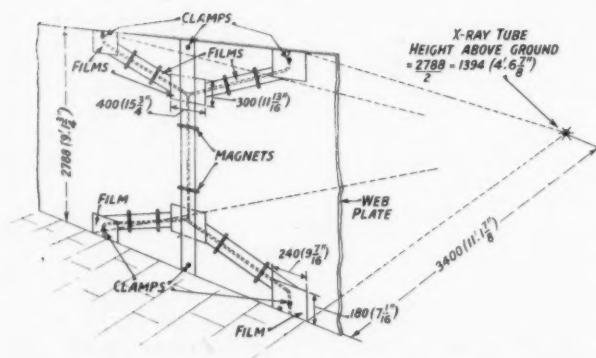


Fig. 13—Arrangement of apparatus for X-ray examination of complete joint by a single exposure

and the Berlin-Dahlem Laboratories for Testing Materials maintain a special Department for X-ray Testing, which undertakes work on a commercial basis at moderate prices. Yet more significant is the fact that an ever-increasing number of structural steelworks are adopting X-ray equipment for the routine testing of their products, particularly welded bridges and railway vehicles.

Economics of Welding

During the year 1934, the German State Railway Company, the largest customer for steel structures in Germany, used about 40,000 metric tons (39,370 tons) of steel of normal quality (St 37, with a tensile strength of 37 kg. per sq. mm. or 23.5 tons per sq. in.), and about 3,600 metric tons (3,543 tons) of high-grade structural steel St 52 of tensile strength 52 kg. per sq. mm. or 33 tons per sq. in. Data are not available as to the quantities of these materials used in welded constructions, but a surprisingly large number of welded bridges and

welded station buildings were erected during the year. Since the German State Railway is not interested in manufacturing processes, but only in securing the best possible technical and economic performance, it may safely be assumed that welded constructions have proved satisfactory from the economic standpoint.

Confirmatory evidence of this is to be found in a direct comparison between riveted and welded constructions in the passenger tunnel under the main line station at Duisburg, where some of the plate frames were riveted and others welded. It has been stated by the German State Railway that about 25 per cent. saving in weight, and about the same saving in costs were effected by the welded structures. This is only one case among many, and there is every indication that the use of welding will continue to extend rapidly.

The author acknowledges his indebtedness to the Reichsbahndirektion Stettin for Figs. 6, 7, and 8, and to R. Seifert & Company of Hamburg for Figs. 9, 12, 13, and 14.

NEW YORK-CHICAGO IN 16½ HOURS.—The New York Central and the Pennsylvania Railroads have just announced a further acceleration of their New York-Chicago services, to take effect with the autumn timetables on September 29. Under the new schedules, the Twentieth Century Limited of the former company and the Broadway Limited of the latter will each make the journey in 16½ hours, a reduction of half-an-hour when compared with the present schedules. These new schedules will involve for the New York Central an average speed of 58.26 m.p.h., including intermediate stops, over the entire journey of 961 miles. The average speed of the Broadway will be a little over 55 m.p.h., for though the line it must traverse is 53 miles shorter, it is considerably more difficult, involving the crossing of the Allegheny Mountains which the New York Central route avoids.



Fig. 14—Welded web joint, showing film holders covered with lead sheet

RAILWAYS AND ROAD TRANSPORT SECTION

This section appears at four-weekly intervals

Co-ordination in Ulster

WITH the actual taking-over of the Belfast Omnibus Company's undertaking on Tuesday next the Northern Ireland Road Transport Board will begin its operative life. In the meantime, the composition of the joint committee that is to consider the matters of the co-ordination of road and rail services and the pooling of receipts has been appointed. In Major Malcolm Speir, of the Northern Counties Committee of the L.M.S.R., Mr. J. B. Stephens, of the G.N.R. (I.), and Mr. F. W. Minnis, of the Belfast & County Down Railway, the railways have representatives with an extensive experience of co-ordination work which should prove of great assistance to the committee, whose other members are Mr. D. L. Clarke, Chairman of the Transport Board, Mr. Samuel Haughton, and Mr. James McCrea, the General Manager of the board. The joint committee seems assured of a strenuous time, for the co-ordination of existing services and the provision of new ones, through bookings, inter-availability of tickets, fares, rates and charges must provide many problems not easy of solution, while a scheme for pooling receipts has to be prepared and submitted to the board and the rail-

way companies before the end of the year, unless further time is allowed by the Minister of Home Affairs. It has to be remembered that the board is to operate both goods and passenger services so that the problems of co-ordination will not be quite so simple as if they were concerned with bus and coach services alone.

Laid Up for Winter

THE end of this month and the introduction of winter schedules will doubtless see a considerable number of passenger carrying vehicles parked away for the winter. The actual proportion of the fleet which has to be withdrawn from service on this account tends to become smaller each year, thanks to the co-ordinating results of the present system of licensing. In the case of some operators whose services are operated mainly in the neighbourhood of coastal resorts it is inevitable that the seasonal fluctuation should be large, but in those which take in a large rural area, where towns and villages provide scope for linking-up services all the year round, the proportion that has to be stored during the winter may be in the neighbourhood of one-fourth of the total number owned.



A typical scene in connection with the Road Motor Services of the South African Railways and Harbours. This 6-ton, petrol-engined Thornycroft six-wheeler carries a composite body with accommodation for first class, second class and third class passengers, as well as mails and freight. It is seen at M'Babane station in Swaziland. (See also next page)

South African Road Services

IN the September issue of the *South African Railways and Harbours Magazine* reference is made to the fast road services now being introduced to supplement the railway branch line services in certain places.

An example of this is seen in the Witwatersrand, where people who have their place of business in Johannesburg reside along the Reef, and *vice versa*. Although the Reef enjoys a fairly extensive train service, this cannot be regarded as being entirely suitable for the requirements of the travelling public, many of whom have to use other means of conveyance to travel to and from the railway stations. In order, therefore, to provide better direct travelling facilities, road motor services are operated from Germiston to Boksburg North and from Boksburg to Benoni. Combined rail and bus tickets are issued for these routes.

On the West Rand, a fast passenger service is operated

In the Cape Peninsula the service between Capetown and Hout Bay also gives the traveller the impression that the route was chosen more from the tourist's point of view than for commercial purposes but, here again, the demand for extended passenger transport brought the service into being.

The Road Motor Services, which were started with the object of developing the country, have also done much to open up scenic and health resorts which had previously only been the privilege of comparatively few.

With regard to the fast services, the General Manager, in his monthly *Bulletin*, states that with the object of accelerating the journey between Bremersdorp and Breyten, a distance of 112 miles, as well as to provide more comfortable travelling, two new vehicles of different design to those usually employed on the routes have been put into service. On high-powered four-wheeled chassis



One of the 12-ton 6-cylinder oil-engined Thornycroft six-wheelers, employed by the South African Railways for conveying cream in Swaziland

from Johannesburg to Roodeport, catering for the needs of the mining areas along this route as they are in most cases a considerable distance from the railway line.

An intensive road motor service also operates between Pietermaritzburg and Durban. The distance by rail between these two cities is 71 miles, while the total distance covered by the bus is only 58. Apart from the time that is saved by travelling by road, this service is known to traverse one of the most beautiful parts of South Africa. No one who has ever journeyed along this road will ever forget the grandeur of the scene which appears before the traveller's view in the Valley of a Thousand Hills. There is the rugged majesty of the mountains blended with the soft, rolling undulations of the hills. The winding road perpetually reveals a changed landscape. It is, indeed, a place where one has the desire to linger in order to appreciate to the full the rare beauty so lavishly endowed by Nature.

have been mounted bodies divided into three compartments. The front one affords accommodation for twelve first-class European passengers whose comfort has been considered by the provision of well-sprung seats and full drop windows, together with improved lighting, spacing, &c. The centre compartment has been designed to seat the better class non-Europeans and six seats are provided. The rear compartment is set aside for the conveyance of mails, passengers' luggage and small parcels of a perishable nature limited to a total of 3,000 lb. These vehicles will be utilised to maintain an express service between the points named, with stops at certain scheduled halts.

During June, 1935, the services carried 211,549 passengers, 26,123 tons of goods and 88,140 gallons of cream, all these traffics shewing substantial increases as compared with June, 1934. The revenue amounted to £32,556, a falling-off of £2,000 due to reductions in rates and fares brought into force at the beginning of the month.

Mobile Cranes in Railway Service

An example of the latest design supplied by Walker Bros. (Wigan) Ltd. to the Northern Counties Committee of the London Midland & Scottish Railway

AMONG the changes that have taken place in railway working in recent years, one which has been noted and illustrated in these pages from time to time has been the use of mobile cranes. Several reasons have combined to make this development one which enables the railways to improve their goods handling service at a capital cost which may be considered worth while in these times when expenditure of this sort has to be so closely scrutinised. As can be readily understood, manufacturers of heavy goods, especially machinery and constructional steel work, are anxious to transport their productions in as large units as can be handled by the railway, but very often the station nearest to the destination has lifting equipment of quite sufficient capacity for its normal traffic although not powerful enough for the heavy pieces that may occasionally be offered. To replace the lifting tackle at every goods station by up-to-date appliances capable of meeting any demand would involve an outlay which could not be even thought of. The necessity of giving each station cranes of sufficient capacity to deal with any load that might ever be offered has been obviated by the success that has been obtained with the latest mobile cranes, as one machine is able to serve all the stations in a wide area.

We are able to illustrate on this page one of these vehicles that has recently been supplied by Walker Bros. (Wigan) Ltd. to the Northern Counties Committee of the London Midland and Scottish Railway. The design is founded upon that of machines which have been giving satisfactory service with this railway for several years, but there have been changes suggested by experience as well as others which may be attributed to engineering development. Among the chief differences may be noted; the replacement of the hand-operated luffing gear by a power device giving level luffing; the use of a chain drive in place of the cardan shaft originally utilised; the fitting of a diesel engine instead of one using petrol.

From the working point of view it is important to note that the hoisting speed has been increased from 25 ft. to 32 ft. a minute with a 6-ton load, and from 30 ft. to 40 ft. a minute with a 3-ton load. Another noteworthy feature is the stability of the unit, for with the jib at right angles to the chassis, the load on the wheels of the rear

bogie away from the jib is 3 tons. 16 cwt. 1 qr. when lifting 6 tons, and 4 tons 6 cwt. 3 qr. when raising 3 tons 2 cwt., which compares with 10 tons 13 cwt. 3 qr. when the jib is unloaded. With the jib at the rear in line with the chassis, the load on the front wheels when 6 tons is being lifted is 1 ton 5 cwt. 3 qr., or with 3 tons 2 cwt. on the hook, 2 tons 8 cwt. 3 qr., while the stress when the jib is unloaded is 6 tons 11 cwt. 3 qr. With the jib in that position the total weight of the vehicle is 18 tons 10 cwt., well distributed over the wheels, the front ones as we have said taking 6 tons 11 cwt. 3 qr., the leading ones of the bogie sharing 5 tons 14 cwt., while those on the rearmost axle carry 6 tons 2 cwt. 3 qr. The rate of slewing is three revolutions a minute, with a 6-ton load, while the maximum travelling speed over the ground is now 7 m.p.h. when running light, or 5 m.p.h. with a full load.

It may be added that the 6-ton load is lifted at 10 ft. radius, while 3 tons may be lifted at 15 ft. 6½ in. radius, and the hook can be arranged to drop down below ground



A mobile crane, with diesel-electric drive by Walker Bros. (Wigan) Ltd., for the Northern Counties Committee, L.M.S.R. It can deal with loads up to 6 tons and can travel along the highway at 7 m.p.h.

level if required. The full travel of the derrick can be made in 12 seconds. The overall height in travelling position is 14 ft. 1 in.; from the ground level to the hook in the 6-ton position the distance is 19 ft. 6 in., while in the 3-ton position the height to the hook is 10 ft. 6½ in.

The power plant in this outfit is the Dorman-Ricardo diesel, which gives 40 b.h.p. at 1,750 r.p.m., and it drives

a 22-kW. generator to provide 250 V. For travelling there is a series wound compoles motor giving 25 b.h.p. at 1,500 r.p.m.; the combined derrick and hoist motor, 16½ b.h.p. at 750 r.p.m., is series wound compoles, while the slewing motor gives 3 b.h.p. at 600 r.p.m. and is also series wound compoles. Both the generator and travel motor are screen protected, and the crane motors are totally enclosed.

Co-ordination in New Zealand

THE latest addition to the fleet of buses owned by the New Zealand Railway Department is a 33-seater, mounted on a Leyland Lion chassis fitted with the Leyland torque converter. It has created a very favourable impression by its smooth and silent operation, the absence of any jolting when starting or stopping being specially appreciated. The Railway Department now operates 60 buses and 7 service cars on 6 routes in various parts of the Dominion. Last year 3,011,187 passenger journeys were made and the profit was £5,672, an improvement of £3,304 on the previous year. All the bodies of these vehicles are constructed in the railway workshops.

As a result of negotiations which have been proceeding off and on for the past two years, an arrangement has been reached between the Railway Department, two shipping companies, and the Napier-Wellington Transport Company, with the object of eliminating the competition hitherto existing for freight transport between Wellington and Napier. Napier is on the East Coast, 200 miles from Wellington, and with the roads now tar-sealed almost all the way, the road competition had grown so keen that railway rates were brought low enough to combat them, but that had an adverse effect on shipping between Wellington and Napier.

Approximately eight of the existing fleet of lorries owned by the Napier-Wellington Transport Co. Ltd. will be out

of commission as a result of the new arrangement, but it is probable that some other avenue of service will be found for them and the drivers engaged.

This development has been explained by the Commercial Manager of Railways, Mr. A. W. Wellsted, as a co-ordinated effort whereby the former road operator, who did the greater bulk of the business between Napier and Wellington, collects the goods in Wellington, Napier or Hastings either by his own vehicles or through agents, loads them on railway trucks, and unloads and delivers them at their destination. The Railway Department's part is to perform the haulage from Wellington to Napier and Hastings or *vice versa*, a guaranteed tonnage of 50 tons a week being required. The service is almost identical with that previously given as far as the consignees and consignors are concerned, in that the goods are landed in Hastings and Napier for an 8 a.m. delivery. The only difference is that they are rail- instead of road-borne between the terminal points.

This is regarded as one of the most successful schemes of co-ordination of rail and road yet achieved in the Dominion. The shipping interests are also in accord and have lent their support towards the stabilisation that has been reached. Similar road-rail co-ordination schemes which are already in existence operate from Christchurch to Timaru, from Auckland to Whangarei northwards and from Wellington to Palmerston North.



A good example of what some A.E.C. single deckers are called upon to do is provided by this Regal, climbing the 2½ miles long Porlock Hill on the regular Western National services between Minehead and Lynmouth. With a maximum gradient of 1 in 4 the ascent of this hill is at any time a hard business; with this vehicle carrying up to 32 passengers and their luggage, climbing the stiff gradient throughout the year, the performance becomes doubly meritorious. Despite the sustained low gear work, the vehicle has never given the slightest indication of any inability to perform its difficult task

The Latest Leyland Cubs

A design that is eminently suitable for dealing with loads of three or four tons or for small bus work. It may be fitted with either a petrol or a compression-ignition oil engine

THE latest data sheet issued by Leyland Motors Limited, relative to the successful Cub type of vehicle, shows five models in the goods series and four in the passenger-carrying class, and in every case the power plant may be either the six-cylinder petrol engine or a six-cylinder oil engine of equal power. The two-axle Cubs for goods transport fall into two classes, the short chassis, with either forward or normal control, being designed for a payload of three tons, while the long chassis, again with the alternative of forward or normal control, is produced to carry four tons, and the construction is equal to carrying a considerable overload. The annual tax in the former case is £30, while the four tonners pay £35, this applying whether a petrol or oil engine is fitted.

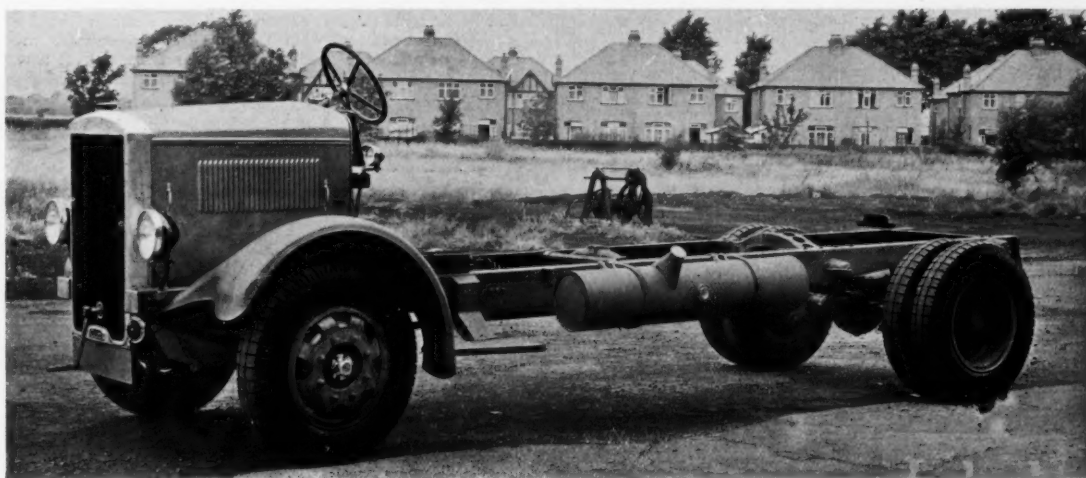
The six-cylinder petrol engine fitted in these chassis has undergone some modification and represents a marked advance among high-efficiency units, especially in the way in which power is developed at the upper end of the speed range, while the fuel economy is noteworthy. With a bore of $3\frac{1}{2}$ in. and a stroke of 5 in., the capacity works out to 289 cu. in. (4,731 c.c.) and at 2,500 r.p.m. the horsepower produced is 85. To a large extent the excellent showing in power and fuel economy is attributable to what has been termed the "bath tub" head. It is a single compact casting with the combustion chambers machined in the head so as to secure a uniform compression ratio. All valve seats are of the screwed-in type, the inlet seats being of a medium carbon-steel and the exhaust seats of steel faced with stellite. The whole head can be lifted and taken to the bench for detailed attention without disturbing the valve timing. Another point about the head is the generous supply of water that flows round the valve pockets. The manifolds have been evolved with the object of securing the utmost efficiency at all speeds.

The cylinders and crankcase are in one casting to secure rigidity of the unit, and cylinder liners of centrifugally-cast iron enable renewals to be simply carried out when they become necessary. The crankshaft, with a bearing



One of the latest Leyland Cubs, with an open body, carrying a load of machinery

of ample size on each side of every connecting rod, which gives it a total main bearing area of 79 sq. in., is typically sturdy and besides being balanced statically and dynamically, is fitted with a vibration damper. A detail will serve to show how thoroughly the lubrication system has been worked out. Not only is lubricant forced under pressure through drilled oilways to the crankshaft



This view of the chassis of one of the latest Leyland Cubs emphasises the clean and sturdy lines of the design. The Cubs are for loads of 3 or 4 tons, the former on the short wheelbase models and the latter on the longer wheelbase type

bearings, timing gear, and overhead valve gear, but each connecting rod is drilled longitudinally to the gudgeon pin, ensuring that a full supply of oil is available at this point. There is an automatic tensioner on the timing chain so that adjustment is unnecessary. All the other accessories are located in positions which permit of easy inspection or adjustment.

The Cub oil engine that is interchangeable with the petrol motor has six cylinders of $3\frac{3}{8}$ in. bore by 5 in. stroke and develops 28 b.h.p. at 1,000 r.p.m. and 60 b.h.p. at the governed maximum speed of 2,400 r.p.m. It weighs approximately 873 lb. complete with 5-in. 180-watt dynamo and 5-in. starter. Here again the cylinder head is simple and compact as it contains no part of the combustion chamber. This simplifies the operation of removing the head with all the valve gear for reconditioning, and renders it possible to fit a spare head with valves ground and set with the minimum of delay. The design embodies the advantages of the Leyland 8 litre type, of which many hundreds are in service, and it embodies the Leyland direct injection combustion chamber, which permits economy to be secured in association with smooth and quiet operation.

As regards their general appearance the new Cubs bear a closer resemblance to the lines of the larger models than did their predecessors. To some extent this is due to the use of a straight side frame, to save a little weight, primarily, while the front axle is set back in accordance with modern practice. From the engine the power is transmitted through a single plate clutch, a four speed gearbox and balanced tubular propeller shafts with needle-bearing couplings to the worm drive on the full-floating back axle. Stars forged on the axle shafts transmit the drive to the wheels, the load being carried entirely by the casing. Light but steady steering is secured at all speeds through the adoption of the Marles type of cam and roller steering gear. Brakes on all wheels are hydraulically operated by the pedal while the hand brake operates on the rear wheels through metal ribbons. The semi-elliptic springs are of silico-manganese steel incorporating double rolled eyes and the rear springs are of the progressive action type. A mechanical tyre pump and power take-off can be arranged at an extra charge. The equipment is a comprehensive one, including speedometer, clock, oil pressure gauge and dash lamp and, of course, a spare wheel and tyre.

Co-ordination of Transport in Argentina

One of the latest moves in Argentina in the endeavour to meet the severe competition of independent road operators is a measure proposed by the Chamber of Deputies for the establishment of a National Transport Co-ordination Committee, including representatives of railway and road transport operators. It is suggested that all transport undertakings should be licensed for a period of ten years and that transfers could only be effected with official sanction. Tariffs would also have to be submitted for official approval.

Door to Door in the U.S.A.

An interesting development in connection with its door to door collection and delivery service for less-than-carload freight was announced by the Pennsylvania Railroad as coming into operation on September 1. This is a cash on delivery service by which the invoice price of the merchandise is collected from the consignee by the railway representative and remitted to the consignor, a moderate charge, on a sliding scale, being made for the service. It will be available at all of the 2,000 points on the Pennsylvania railway as well as of other railways in adjacent territory that have joined in the scheme. Since the door to door service was started on this railway at

the end of 1933 the traffic has grown until it now accounts for about 3,000,000 consignments a year.

Road Competition in Malaya

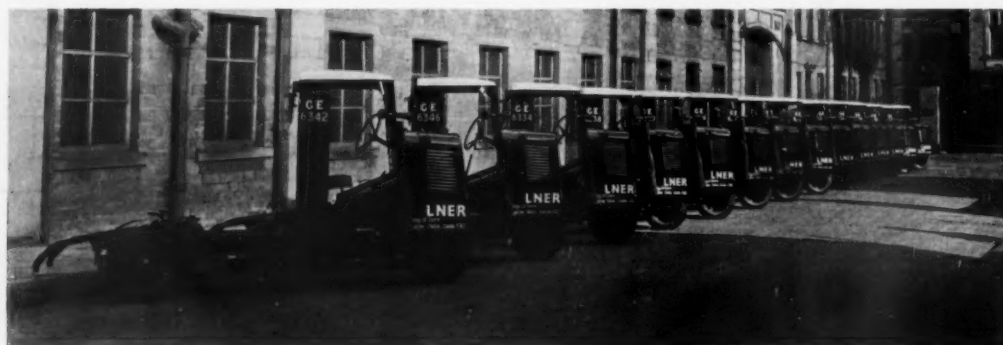
The enterprise of some of those concerns operating buses in the Federated Malay States is indicated by a small poster we have received from a correspondent. One half of it is printed in Chinese characters while the other half is couched in rather quaint English, the bulk of which we reproduce below, simply omitting the list of fares, which run from 3 cents to 25 cents.

"We beg to inform the public that our buses will travel from Butterworth Pier to Sungei Patani today onwards. As we have seen that there are regular buses elsewhere except Bagan Luar and Sungei Patani. Ladies, business men, children and other people find it very difficult to travel to a place where there are no regular buses.

- 1.—Our buses are from the Ford 1935.
- 2.—Our seats are specially made, wide and comfort.
- 3.—Our buses travel with an interval of half an hour. Our times are accurate fast.
- 4.—Our buses are guaranteed from all safty.
- 5.—Our machine are new with strong body, without stopping. Travelers who wish to travel fast and safty are invited to our newly made buses. Our buses travel according to time and not to number of passengers.

Season tickets obtainable at our office.

To let advertisement place on our buses. Apply at our office."



A batch of Karrier Cobs recently lined up at the makers' works ready for dispatch to stations of the L.N.E.R.

RAILWAY NEWS SECTION

PERSONAL

The Northern Ireland Parliament has announced the appointment of a committee of six for the co-ordination of road and rail services, under the new Transport Act. Three of the members of this committee represent the railways :—

Major Malcolm Spier, M.C., Manager and Secretary, Northern Counties Committee, L.M.S.R. ;

Mr. J. B. Stephens, General Manager, Great Northern ; and

Mr. W. F. Minnis, General Manager, Belfast & County Down Railway.

The other three represent the Northern Ireland Road Transport Board, namely :

Mr. D. L. Clarke, Chairman of the board ;

Mr. S. G. Haughton, Member of the board ;

Mr. James McCrea, General Manager.

The joint Secretaries of the committee will be :—

Mr. J. W. Hutton, N.C.C., and Mr. Albert Morrison, Secretary of the Road Transport Board.

The Northern Ireland Road Transport Board has appointed Mr. Albert Morrison as Secretary to the board. Mr. Morrison is Chief Accountant and Assistant General Manager to the Belfast Omnibus Co. Ltd. and as such has worked in close co-operation with Mr. James McCrea, who, as already announced, has resigned the Managing Directorship of that company to become General Manager of the Northern Ireland Road Transport Board. The business of the company is passing to the board on Tuesday next.

On September 20, a luncheon was given at the Soviet Embassy in London in honour of the following officers of the London Passenger Transport Board; Messrs. Frank Pick (Vice-Chairman), A. R. Cooper (Chief Engineer), E. T. Brook (Superintendent, Railway Rolling Stock), Evan Evans (General Railway Superintendent), and J. C. Martin (Assistant); and of Mr. D. Anderson, of Messrs. Mott, Hay & Anderson, Consulting Engineers. The Soviet Chargé d'Affaires presented the Decoration of Merit to the above guests in recognition of their services in connection with the Moscow underground railway. The luncheon, at which Lord Ashfield, Chairman of the L.P.T.B., was present, was arranged in connection with the visit to London of a delegation of engineers of the Moscow underground, headed by M. Abakumov, who thanked Lord Ashfield for the assistance of the L.P.T.B.

We regret to record the death, on September 20, of General William Wallace Atterbury, who, as recorded in THE RAILWAY GAZETTE of May 17 last, then resigned the presidency of the Pennsylvania Railroad.

General Atterbury was born in 1866; graduated at Yale as B.Phil., and also joined the Pennsylvania Railroad as an apprentice in Altoona shops in 1886; he worked his way up in the Me-



*The late General W. W. Atterbury, C.B.,
President of the Pennsylvania Railroad,
1925—35*

chanical Department until, in 1901, he became Superintendent of Motive Power, Lines East of Pittsburgh and Erie. Two years later he was appointed General Manager of those lines, and in 1912, he was elected Vice-President (Operation). During the war he was Director-General of Transportation of the American forces in France and was gazetted a Brigadier-General: He was awarded the American D.S.M., was made a Commander of the Legion of Honour (France), a C.B. (Great Britain), and a Commander of the Crown (Belgium). General Atterbury was elected President in 1925, and had therefore been head of that great organisation for ten years when he resigned in May last.

Mr. Y. Matsuoka, who, as announced in THE RAILWAY GAZETTE of August 9, has succeeded Count Hayashi as President of the South Manchuria Railway Company, seemed, until recently, destined for the highest posts his country's diplomatic service could offer. He completed his education at the State University of Oregon, U.S.A., and entered the Japanese Diplomatic Service in 1904. Ten years later he

became Second Secretary of the Legation at Peiping (Peking), and at an unusually early age became Consul-General at Shanghai. He then abandoned a diplomatic for a political career, becoming a Director and Vice-President of the South Manchuria Railway and a Member of the Diet. In 1932 he personally represented the Prime Minister in Shanghai during hostilities there, and later went to Geneva as Chief Japanese Delegate to the League of Nations. Although he put up a brilliant defence of Japanese policy in Manchukuo, the Lytton report received the approval of the League and Japan resigned. It is believed in some circles, however, that, had he been sent to Geneva when the League took up the Manchurian question and not at the last moment, his brilliant oratory in European languages and inherent knowledge of Manchukuo might have turned the scales in favour of Japan. Mr. Matsuoka now takes up the reins of one of the largest transport concerns in the world, covering all railways in Manchukuo and including some 70 subsidiary concerns, such as steel works, refineries, mines, cement, flour and gas works, steamships, power stations, forestry, insurance, and hotels.

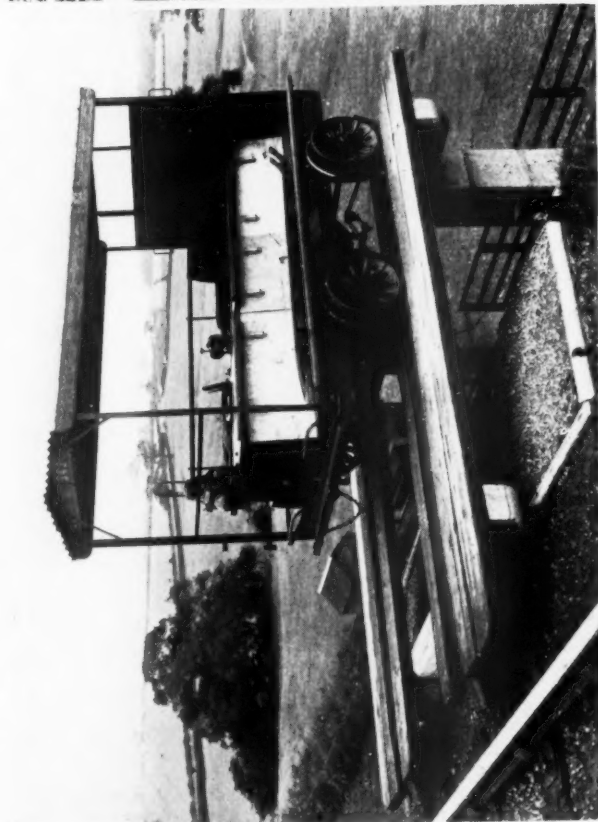
We regret to record the death of Mr. R. E. Morley, Traffic Manager to Bryant & May Limited, on September 23, at Loughton, after a short illness. Mr. Morley, who was born in Cheshire 66 years ago, held positions in the Accounts and Audit Departments of the Lancashire and Yorkshire Railway from 1888 to 1902, and in the latter year became head of the rates and conference section of the District Goods Manager's Office in Liverpool. In 1903, he was appointed Traffic Manager to Bryant & May Limited, and remained in that position until his death. He was a prominent personality in the transport world and his activities covered a wide range. He was a Vice-President of the Mansion House Association on Transport, and held the



Sir Josiah Stamp, Chairman and President of the L.M.S.R., at the opening of the "Model Engineer" Exhibition on Thursday of last week



Train of new coaches, mounted on Timken roller bearings, for the mail services between Brisbane and Cairns, Queensland Government Railways



Run-off for permanent-way gang trolleys as used on embankments on the L.N.E.R. (North Eastern Area). To avoid filling, with in many cases the addition of a retaining wall, pre-cast concrete blocks are used. Note the tidiness typical of the permanent way in the North Eastern Area



position of Chairman of Committees of that body. He represented the interests of the British Match Industry on the Traders' Co-ordinating Committee of the Federation of British Industries, which committee was set up at the time of the passing of the Railways Act in 1921. Mr. Morley was a member of the Traders' Co-ordinating Committee on Dock Charges of the Chamber of Shipping of the United Kingdom, and for a number of years he was a member of the National Council of the Commercial Motor Users' Association. He also represented his company's interests on the Traffic Committee of the Association of British Chemical Manufacturers. He

was a Foundation Member of the Institute of Transport, and served as a member of its Council from 1931 to 1934. He was also a Fellow of the Royal Society of Arts.

Mr. H. C. Drayton has been elected a Director of the Antofagasta (Chili) & Bolivia Railway and its associated companies, to fill the vacancies caused by the death of Mr. R. J. Hose.

Mr. William Lorimer has been elected Chairman, and Mr. Andrew T. Reid Chief Managing Director, of the North British Locomotive Co. Ltd., in place of the late Sir Hugh Reid, who held

both offices. Messrs. Lorimer and A. T. Reid were formerly Managing Directors of the company.

Señor Joaquín de Arteaga, Duque del Infantado, has resigned his post as Chairman of the Andaluces Railway Company. Señor Arteaga will, however, continue on the board as an ordinary director.

Mr. George Pate, M.I.A.E., Managing Director of Albion Motors Limited, has been elected Chairman of the firm in succession to the late Mr. N. O. Fulton. Mr. Pate, however, retains the office of Managing Director in addition to the chairmanship.

Indian Railways

Presidential Address by Mr. A. C. Carr, V.D., to the Institution of Locomotive Engineers

At the opening meeting of the 1935-36 session of the Institution of Locomotive Engineers held on September 19 in London, Mr. H. N. Gresley, C.B.E., Chief Mechanical Engineer, L.N.E.R., and President of the institution for the 1934-35 session, formally inducted Mr. A. C. Carr, V.D., of Sir John Wolfe Barry & Partners, into the chair as the new President for 1935-36. Those present included Messrs. W. A. Agnew, H. Kelway-Bamber, M.V.O., Capt. H. P. M. Beames, Messrs. A. M. Bell, W. J. Tomes, Sir Seymour B. Tritton, Major C. E. Williams, and Mr. R. H. Whitelegg.

Mr. Carr in a brief speech said that with their help he would do his best to further the esteem and prestige of the institution. The new president recalled the support which Mr. Gresley had given the institution and the good work he had done by his advocacy of a locomotive testing plant for use in this country. He acknowledged his indebtedness to Sir T. R. Wynne, Chairman and Managing Director of the Bengal-Nagpur Railway, for the loan of photographs from which his presidential address, to follow, was illustrated.

Major C. E. Williams, C.B.E., expressed on behalf of the institution thanks for the work done for them by Mr. Gresley during his year of office, and Mr. J. Clayton, M.B.E., supported the vote of thanks. Mr. Gresley in reply said that he had visited all the centres in the provinces during the year and he could not speak too highly of the reception there accorded him. His year of office had enabled him to recognise still further the value of the institution. He then called upon Mr. Carr to read his paper.

Mr. A. C. Carr took as his subject Indian Railways, with special reference to the Bengal-Nagpur Railway, and opened his remarks with figures showing how the 42,953 miles of Indian railways were divided into 5 ft. 6 in., 3 ft. 3 in., 2 ft. 6 in. and 2 ft. gauges,

remarking that, of the total, only about 8½ per cent. was double track, or more, and that the bulk of the traffic had therefore to be worked on the single-line non-mechanical token system. He emphasised the great rail distances between the large cities of India, as for example the 1,223 miles from Bombay to Calcutta by the Bengal-Nagpur route, which approximated to three times the distance between King's Cross and Edinburgh.

After quoting statistics to illustrate the numbers of locomotives, rolling stock, and staff engaged on Indian railways, Mr. Carr showed that the consumption of locomotive coal for the year 1933-34 was 5,904,586 tons, all, with the exception of 2,333 tons, produced in India. The cost of this coal, including freight, varied from the equivalent of 7s. to 29s. 6d. a ton. The varying quality of coal used made standardisation of grates, air spacing, brick arches, and blast pipe orifices of locomotives impossible if best results were to be obtained in service.

With illimitable supplies of comparatively cheap indigenous Indian coal available, Mr. Carr considered the general use of diesel locomotives on railways adjacent to the coal fields to be remote. Fuel costs, for example, on the East Indian Railway for the year 1933-34 amounted to about 9d. per 1,000 gross ton-miles. As regards comparative costs of operating diesel and steam locomotives, Mr. Carr thought that over a period of years, in the case of the diesel savings might be effected in water charges, running shed expenses, engine staff wages and fuel charges, while increased costs might be expected for lubricating oil, maintenance and interest, and depreciation. During the last 8 years, he added, oil fuel had varied in price, up and down, by approximately 25 per cent., and steam coal by 11 per cent. Probably due to more extended use of superheated locomotives and more efficient maintenance, coal consump-

tion on Indian broad-gauge railways for the year 1933-34 was 126.3 lb. per 1,000 gross ton-miles, compared with 151.9 lb. ten years ago.

The author then dealt with the moderate amount of electrified line in India, the general use of superheated steam for locomotives, and the extending use of poppet valves and rotary gear, the use of electric headlights (which apparatus British makers can now provide), and, incidentally, the novel employment of electric exterior lighting for coaches for use when standing at dimly lit roadside stations. The use of vacuum brakes for goods stock was also touched upon.

Endeavours were being made on Indian railways to increase the daily mileage of locomotives in use. The average figure on all Indian broad-gauge lines for 1933-34 was 107 miles a day per engine in use, and 10.4 miles were run per engine-hour during the same period. Comparative figures for the L.M.S.R. in England were respectively 110.5 miles a day and 9 miles run per engine-hour for 1934. Assuming that each broad-gauge engine ran 107 miles a day, then the total Indian broad-gauge steam engine mileage of 126,898,000 miles for the year 1933-34, Mr. Carr found, would require 3,250 locomotives in use out of a total of 5,670, or 58 per cent. On the L.M.S.R. comparable figures for 1934 gave 5,266 steam locomotives out of a total of 8,004, or 66 per cent., to give the total mileage run, assuming a daily mileage of 110.5 miles per engine in use. The average mileage a day of all four British group railways' locomotives was 70.3 (the Southern Railway having a figure of 75.5 miles), as compared with 61 per engine on line on Indian broad-gauge railways. The author concluded his general remarks on Indian railways by noting the increasing use of water softening plant, and then followed with an outline of the origin and development of the Bengal-Nagpur Railway, illustrating his remarks by a number of lantern slides, and concluding with a view of a Beyer-Garratt locomotive hauling a goods train of 2,060 tons of vacuum-braked stock, loaded with iron ore, and a contrasting view of a native camel caravan.

MINISTRY OF TRANSPORT ACCIDENT REPORT

Welwyn Garden City, London & North Eastern Railway : June 15, 1935

The report by Colonel Mount hereon was issued on Friday last, September 20. It relates to the collision between train No. 826—the down express passenger, parcels and mail train that left King's Cross at 10.58 for Leeds—and No. 825A—the second portion of the 10.45 p.m. from King's Cross to Newcastle. Thirteen passengers, all in the latter train, and its guard were killed. The accompanying diagrams are reproduced from the report. As it is a document of 20 pages it is difficult to summarise, so we give instead Colonel Mount's "Conclusions," and his "Summary and Recommendations."

As details of the composition of the two trains and of the damage done were given in our report of the Ministry of Transport inquiry in THE RAILWAY GAZETTE of June 28, we have not reproduced these. On the other hand, Colonel Mount refers in his "Conclusions" to certain matters mentioned in the main part of his report, which must be related in order that his comments may be understood.

Mr. Hook, one of the eight signal inspectors of the district, said:—

The selection of applicants for signalmen's positions is made by the district superintendent and not by the district inspector. . . . Howes (the signalman at Welwyn Garden City) answered my questions quite satisfactorily, but he did not strike me as one of the brightest of men. I had to drag everything out of him, as he was not at all forthcoming. I would have preferred a man I had in my own district . . . but it was a case of seniority and it was not for me to say who should get the job. I do not think the senior men should always have the jobs and, in my opinion, it should go by merit rather than by seniority. I think the system of seniority is prejudicial to getting the best men in the boxes. I think the railway companies should have the right to choose whom they think best. I think, going among signalmen generally, as I do, I should know their capabilities.

Mr. A. G. Rickett, late Signalling Superintendent, Superintendent's Office, Western Division, who kindly attended the inquiry at the suggestion of the company's officers and at the request of Colonel Mount, said that he had known Howes for some years as a signalman at Kirton and Doncaster A boxes. Mr. Rickett expressed his opinion of Howes' capabilities and suitability as follows:—

I did not think he was a very brilliant signalman and I think the same today. I would not say he does not know his rules and regulations, but at the time I knew him at Kirton, from 1922 to 1926, I would not have expected him to have taken over a Class I box, but since the new method of dealing with promotion, men have got to higher positions than one would expect.

The evidence of the signalmen was given in private at the original inquiry and therefore remains to be related. In order to condense it we have prepared the table opposite:—

It will be noted that we have

queried the receipt at 11.23 by signalman Crowe at Hatfield No. 3 of *out-of-section* for No. 825A, and the despatch to Howes of the *Is-line-clear?* and the *train-entering-section* at 11.23 and 11.25 respectively for No. 826, as those are the signals in dispute. Signalman Crowe was surprised at receiving *train-out-of-section* for No. 825A two minutes after it had passed him, so he telephoned Howes and asked "Is that out?" Howes says that he thought No. 825 was referred to so he answered "Yes." No. 826 was then offered by Crowe but Howes denied all knowledge of it, also that he had cleared, as alleged by Crowe, No. 825A. He, Howes, said that he did not send *out-of-section* or *train-entering-section* forward to Welwyn North for that train as he was waiting to see the tail lamp.

Two other incidents remain to be noticed: (1) The handing to Howes, when he went on duty, of the disciplinary notice referred to later and (2) the telephone messages he received from a porter as to making inquiries of the Hatfield station staff concerning a missing parcel. The report then proceeds as follows:—

"This collision resulted from the improper entry into the Hatfield-Welwyn Garden City section of down train No. 826 when the section was still occupied by the preceding train, No. 825A. This was brought about by a lapse of the most serious nature on the part of Signalman Howes of Welwyn Garden City; but the details of what actually happened must remain uncertain.

"The crucial time was 11.23 p.m., when according to his evidence, Signalman Crowe, of Hatfield No. 3 box, received the *out-of-section* signal from Howes, for, he presumed, train No. 825A, and when he immediately offered Howes, and received his acceptance for, train No. 826. I do not think there is any doubt that the exchange of these two bell signals took place.

"Although Howes pleaded entire ignorance of train No. 826, and, by inference, persisted in suggesting that Crowe had permitted this train to enter the section without authority, the telephone conversation with regard to the former bell signal admittedly took place, and Crowe would not have initiated the verbal inquiry had he not received the bell signal and been uncertain for the moment as to its reliability. There was thus subsequent verbal confirmation of the bell communication, and Crowe is therefore free from responsibility so far as his block operation is concerned; clearly Howes' reply set his mind at rest before he lowered his signals and permitted train No. 826 to enter the section.

"On the other hand, the fact that this breakdown in block working occurred indicates that there was misunderstanding between the two men, arising from Crowe's brief question and Howes' briefer answer. I cannot believe that the accident would have happened had the purport of Crowe's uncertainty immediately penetrated Howes' mind and had it caused him to realise—assuming he was prepared to admit his mistake—that he had wrongly transmitted the *out-of-section* signal for No. 825A without having seen the train.

"While the use of the telephone in connection with block operation is to be deprecated, this means of rapid communication is necessary for a contingency such as this. But the form of the question and answer should be precise and quite definite, leaving no loophole for wrong assumption, and I cannot but express regret, as Crowe himself did, that such an experienced and entirely reliable signalman, as he is, was deceived by the assurance which he received from Howes.

"The clocks at the three boxes concerned appeared, for all practical purposes, to be synchronised. The significance of the time referred to above, 11.23 p.m., lies in the fact that it was then that the up goods train, No. 787, passed Welwyn Garden City, as recorded there by Howes and at Hatfield No. 2 by Signalman Broughton. Further, and more significant still, it was also the time recorded by Howes

Train No.	Signal Box	1	2	3	4	5	6	7	8	9
825	Hatfield No. 3 ...	11.11	—	—	11.17	—	—	11.20	—	—
	Welwyn North ...	—	—	11.11	—	11.17	11.17	—	11.20	11.22
825A	Hatfield No. 3 ...	11.20	—	—	11.21	—	—	11.23	—	—
	Welwyn North ...	—	—	11.20	—	11.22	11.22	—	—	—
826	Hatfield No. 3 ...	11.23	—	—	11.25	—	—	—	—	—
	Welwyn North ...	—	—	—	—	—	—	—	—	—
787 Up goods	Welwyn North ...	—	11.16	—	11.23	—	—	—	—	11.27
	Welwyn Garden City	—	—	11.18	—	11.23	—	—	11.23	—

1. *Is line clear?* sent and accepted
2. *Is line clear?* sent but not accepted
3. *Is line clear?* accepted
4. Train passed and *entering-section* sent

5. *Train-entering-section* received
6. Offered to box in advance and accepted
7. *Out-of-section* received
8. Train passed and *out-of-section* sent
9. *Out-of-section* received.

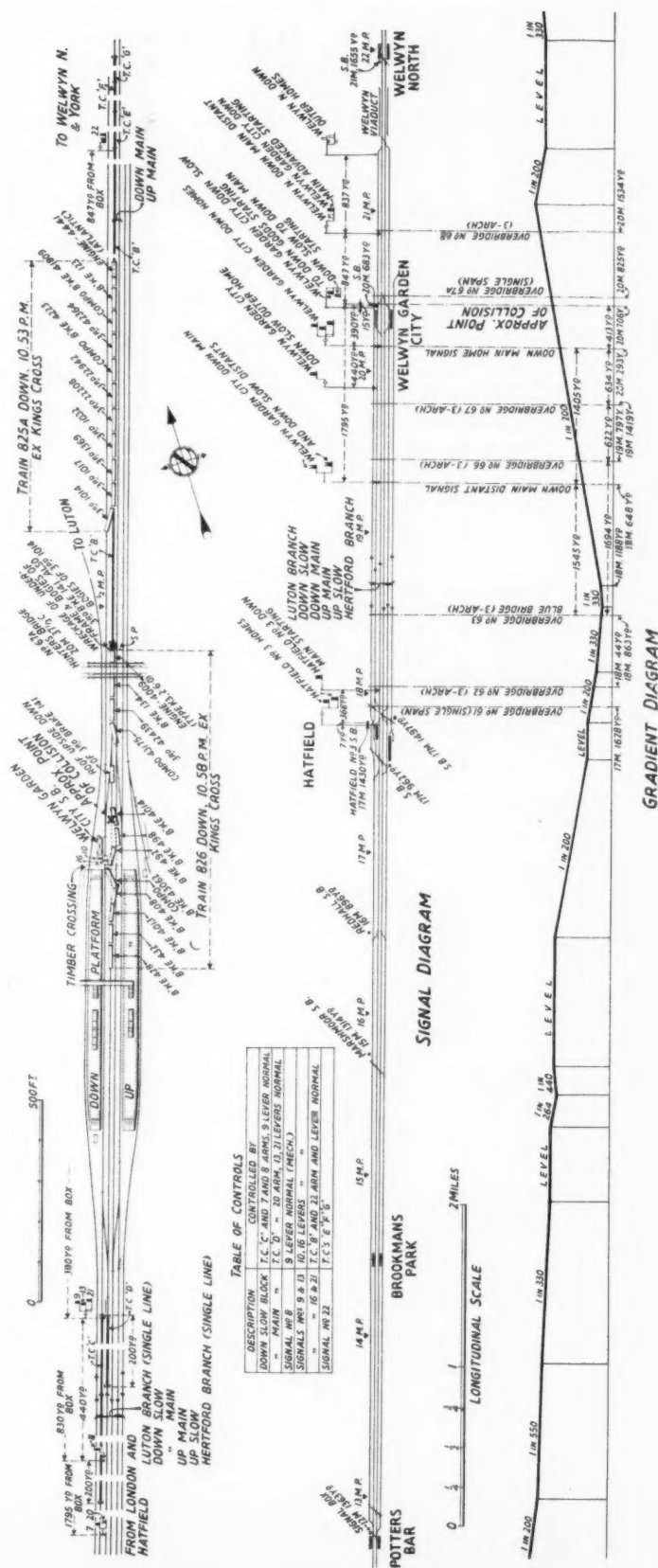
for the transmission to Welwyn North of the *out-of-section* signal for this train, although signalman H. Ball of that box did not record the receipt of that signal till as late as 11.27 p.m., when, at the same time, according to his evidence, he received, and recorded, the *entering-section* signal for train No. 825A; I presume that Howes transmitted the latter a few moments before the accident happened, though Howes himself did not record the signal and denied having sent it. Howes could also offer no explanation with regard to the receipt by Ball of the *out-of-section* signal at 11.27. In this connection I accept Ball's evidence; he appeared to be a reliable man with a good record.

It is quite clear that train No. 825 was dealt with properly; it passed Welwyn Garden City at 11.20 p.m. The next train to pass was No. 787 on the up road, at 11.23 p.m., by which time train No. 825A had been in the section, approaching Welwyn Garden City on the down road, for two minutes.

"The belling and block indicator work up to that time appears to have been correctly carried out. Howes had accepted train No. 825A at 11.20 p.m., and the train entered the section at 11.21 p.m.; Howes' record shows the acceptance of the latter signal at 11.23 p.m., but it was altered to 11.22 p.m., and his explanation in that respect appeared to be reasonable, though the time is a minute behind the Hatfield record. He also received Ball's acceptance for the train at 11.22 p.m., and both registers tally in that respect; but there is his admittance that, thereafter, he was late in lowering his signals for the train.

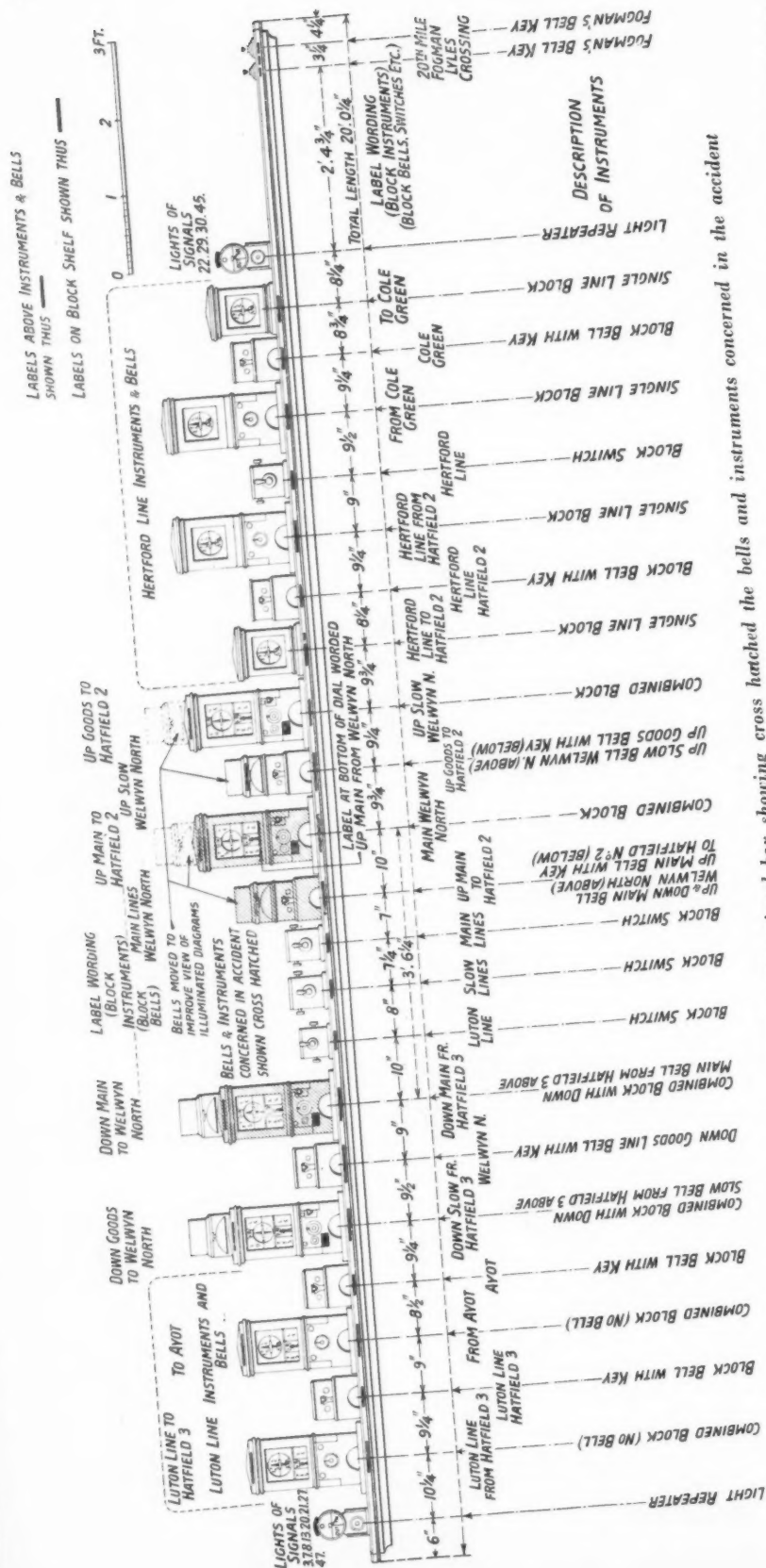
"Howes alleged that the second telephone conversation, with Porter Jakes, intervened at this time, but the latter's evidence, which I have no reason to doubt, indicates that this conversation took place a little earlier, possibly even before train No. 825 passed. Howes' account was also to the effect that his conversation with Crowe interrupted that with Jakes, but this is, of course, still less probable, because at 11.23 p.m. he cannot have been speaking at a telephone instrument to Crowe when he transmitted the *out-of-section* signal and accepted No. 826, viz., before Crowe initiated the conversation. In fact, it must have been at about this time, 11.22 p.m. to 11.23 p.m., that Howes' lapse occurred, his lowering of the signals for train No. 825A having been delayed till after his conversation with Crowe, and therefore after his erroneous transmission of the *out-of-section* signal and acceptance of train No. 826.

"In view of the evidence, and of the records of the bell signals described above with regard to the passage of the up train at 11.23 p.m., the company's officers were of the opinion that Howes transmitted this *out-of-section* signal at 11.23 p.m. to signalman Crowe, instead of to signalman Ball, viz., for down train No. 825A which had not



Track layout and signal diagram of L.N.E.R. main line in the vicinity of Welwyn Garden City, showing positions of trains after the collision on June 15 last

September 27, 1935



Details of block shelf in Welwyn Garden City signal box showing cross hatched the bells and instruments concerned in the accident

reached him, instead of for up train No. 787 which had passed him. They suggest that when train No. 825A was about to pass, and just before the collision, he transmitted—contrary to his evidence—the entering-section signal for it at 11.27 p.m., as recorded at Welwyn North, and that he noticed on the adjoining instrument that he had not transmitted the out-of-section signal for train No. 787; it is assumed that he would then have done so, in order to clear the instrument as soon as he noticed it; hence the booking at Welwyn North. In brief, the result was that Howes lowered his signals twice for the three down trains which were running block to block. On the first occasion, he did this in the usual manner after he obtained acceptance for train No. 825; but on the second occasion, the signals were not lowered until after he had erroneously accepted train No. 826, on the assumption that he was still dealing with No. 825A, for which he had already obtained acceptance ahead.

Howes did not think he operated the wrong instrument in this manner; but Inspector Hook and Mr. Rickett said they had had previous personal experience of such a mistake. For such an explanation to be acceptable, it must, of course, be assumed that when the up train, No. 787, passed, Howes unpegged the down main needle, transmitted the 2-1 bell signal to Hatfield, and received the acknowledgment from Hatfield on a bell—as shown on the drawing herewith—situated 2 feet 8½ inches from the bell of the corresponding Welwyn North instrument, which is of different tone. Further, he was thereupon offered and wrongly accepted a train (No. 826) on this same instrument, under the impression that he was accepting a following up train; hence perhaps his suggestion that he was aware of the existence of train No. 825A, but not of No. 826.

On the other hand, I find it difficult to avoid the opinion that Howes' breakdown was due to what might certainly be expected to have been the more likely cause, viz., forgetfulness, and inability to cope with temporary pressure involving quick sequence of bell signals and semaphore operation. Further, his state of mind at the time, as the result of the receipt of the telephoning notice and of the telephoning of messages with regard to the missing parcel, cannot be overlooked; it is true that he did not urge the former, but he referred to the latter as specifically having a bearing upon his failure. He had dealt with 11 up and 10 down trains in 85 minutes since he had been on duty, a number considerably above the average for the shift, and after the passage of train No. 825, the sequence of events appears to have become too much for him. It may be that when he was busiest, he was interrupted by the conversation with Jakes.

If, for instance—contrary to his evidence, which cannot be relied upon—his failure to lower the signals for train

No. 825A was because it entirely went out of his mind, Howes may have glanced at his down line block instrument, and, seeing that it showed *train-entered-section*, assumed that he had omitted to transmit the *out-of-section* signal for the previous train, No. 825, whereas, in fact, he had correctly done so at 11.20 p.m. and had equally correctly operated the instrument again in accordance with his subsequent acceptance at that time of No. 825A, and in accordance with the entry of the train into the section at 11.21 p.m. or 11.22 p.m.

"If this was his mistaken assumption, and if, in consequence, he unpegged the instrument which he intended to unpeg, he was able, because the home and distant signals had remained at 'danger,' to accept, and did in fact accept, train No. 826 at 11.23 p.m., under the impression that it was train No. 825A. On receiving the *entering-section* signal at 11.25 p.m., and after noting that the instrument to Welwyn North showed *line clear*—in reality on account of the previous acceptance of No. 825A at 11.22 p.m.—he lowered his signals. Train No. 825A had by that time been in the section for at least three minutes, as the result of its heavy check; and No. 826, arriving in sight of the distant signal at about 11.26½ p.m., found it clear, not having, by then, been replaced behind No. 825A.

"Obviously the sequence of events, so far as the acceptance of train No. 826 and the lowering of the signals were concerned, must have been the same whether Howes erroneously unpegged the down instrument for the up train, No. 787, or whether he 'forgot' train No. 825A. In either case, there was serious failure of the human element, and, as I have said, the company's officers conclude that the former—a genuine mistake of which Howes was not aware—was the more likely cause. Against the latter theory there is the argument that Howes would normally have asked for *line clear* from Welwyn North on the receipt of the *entering-section* signal for No. 826 from Hatfield at 11.25 p.m., and one would have expected him to have noticed that his instrument was already showing *line clear* for No. 825A; but by that time he had undoubtedly lost grasp of the situation, and his only explanation was that he could remember nothing about train No. 826.

"While he said that in the whole of his experience, since 1912, he had never transmitted the *out-of-section* bell signal in the wrong direction, he admitted that he 'found a little difficulty in the booking' at Welwyn Garden City when he took up the work, and that the maximum period which elapsed between operating his block instruments and entering up his register 'might possibly have been three minutes.' At times also he had 'not been quite certain which bell was ringing, and I have usually waited for the second bell.'

"I have questioned him on three

occasions in connection with this accident, the last being on August 9, by which date it was felt that he had fully recovered from the shock. Mr. Hodson, the Stationmaster, referred to him as a 'quiet, almost peculiarly quiet, man, and it is difficult to get anything out of him.' Signalman Birch emphasised the same characteristic, and Inspector Hook said he had to 'drag everything out of him, as he was not at all forthcoming.' He is obviously a man of quite unusual temperament, of very reserved demeanour, and with marked hesitancy of expression. I doubt also whether he has the power and habit of rapid thought, so essential in such a responsible position on a high-speed main line with comparatively short sections on either side. In addition, there is the operation of two single lines, one of which (Luton) carries considerable traffic.

"The number of trains per hour throughout the day averaged 12.2 in 1934, and varied from 12 in April to 13 in August, there being 106 and 107 during the two day shifts and 81 during the night shift. The fact has already been mentioned that Howes had dealt with 21 trains in 85 minutes, viz., 15 per hour; on June 14, between 5.10 p.m. and 6.27 p.m., Signalman Birch also handled 27 trains, viz., 21 per hour. The box contains 45 working levers; the instrument shelf has 11 block bells. There are also five telegraph instruments, and in addition to the telephone used for traffic control purposes, there is a telephone and switchboard, to which three omnibus circuits—with respectively 7, 15, and 7 instruments on them—are connected, having five trembler bells—one in each circuit, one on the instrument, and one for the ring-off signal.

"When the marks were last taken in December, 1934 (317.5 per hour), the number of telephone and telegraph written and verbal messages dealt with daily, other than those for operation and control purposes, amounted to 10 and 9 respectively; there were also nine switching operations in connection with extraneous conversations. When I watched the working of the box on the morning of July 31, I formed the impression that these figures may not fully represent the amount of such work, at any rate at busy periods, or when circumstances are exceptional.

"In these circumstances, it follows that the matter of the selection and fitness of Howes for promotion to this post arises. I understand that his promotion had not been unusually rapid; it had been carried out in accordance with the system of selection by seniority among those applying for such appointments. He commenced duty as a signalman in July, 1912, at Navenby, between Grantham and Lincoln, and left there in October, 1921, for Kirton. He was transferred from Kirton to Ranskill in April, 1932, on promotion from Class 4 to Class 3, and again to Doncaster A in February, 1933, on promotion from Class 3 to

Class 2. He entered the Class 1 grade on May 11, when he took charge at Welwyn Garden City. The rise in pay on each of these promotions was 5s. a week.

Ranskill box is on the main line near Retford, and operates high-speed traffic in both directions; it has 33 working levers, and Howes took 17 days to learn the duties. At Doncaster, he took 23 days; this box has 23 working levers and operates up traffic only, partly under Permissive Regulations; it is a busy box. He explained that he took as long as five weeks to learn the duties at Welwyn Garden City, owing to the strangeness to him of the traffic in the district; but this very fact, in my opinion, seems to indicate that possibly he may have been below average, though I was assured that this period was not unusual in the experience of the company's officers for a box of this character, and particularly for a man not used to the district. It will be noted also that Signalman Birch considered that, though Howes had grasped the work satisfactorily and was fit to act as a signalman at Welwyn Garden City, he knew nothing about track circuiting when he arrived.

"But I do not wish these criticisms to be misunderstood. Inspectors Shores and Chamberlain, who examined and supervised Howes' work, for three years, while he was at Ranskill and Doncaster, spoke well of him, the former—who supervised between 500 and 600 signalmen—referring to him as up to average; further, Inspector Hook himself said that he had 'every confidence' that Howes 'would carry on the job satisfactorily.' On the other hand, Hook, unlike the other inspectors, had previous experience as a signalman, and would have preferred another man for the vacancy which Howes filled; also, Mr. Rickett expressed the opinion that in 1926 he would not have expected Howes to have taken over a Class 1 box. Hook, therefore, certainly took the right course in allowing Howes as long tuition as he required; but I think the facts show that in the end he was really deceived as to Howes' suitability for the post. Moreover, Hook has never refused to pass a signalman, and in the circumstances I feel that he would have been wise, in this instance, to have obtained a confirmatory opinion, as the result of interview, by referring the appointment to Mr. Warriner, his District Superintendent. Indeed, it transpired that, as Howes came from Doncaster, Mr. Warriner met him only for the first time when Howes got into trouble after he had been in the district for six weeks.

"The incident of May 18, a week after he took over, commenced with a minor irregularity, but it finally involved a serious question of discipline, as the result of Howes' readiness to hush up the matter with the driver concerned, and his refusal to make the subsequent report which was called for. Indeed, I understand that at the

interview at King's Cross on June 4, Mr. Warriner had to warn Howes that a more serious view, even than the administration of a severe reprimand, might be taken of the matter when the superintendent came to deal with it. It is true that the superintendent's decision merely confirmed what transpired at the interview, and that Howes did not complain that the notice did more than come as a surprise to him; indeed, it may be that its receipt relieved him from apprehension of a more serious penalty, such as removal from the box. But I doubt whether it can be seriously urged that the receipt of the notice, as he came on duty, was unlikely to affect his efficiency, and the incident which gave rise to it was also significant of an undisciplined mind, which might prove unequal to maintaining the standard expected of main line signalmen. In all the circumstances, therefore, I find it difficult to satisfy myself that Howes was really a suitable man to be serving in this important box, and I think his failure proved, in fact, that he was not."

Summary and Recommendations

(1) This regrettable disaster was brought about by a serious lapse on the part of Signalman Howes, of Welwyn Garden City. Either he inadvertently transmitted the *out-of-section* bell signal and cleared the *down* block instrument for an *up* train which was passing at the time, or he operated the instrument with intention and accepted the following train, No. 826, having overlooked train No. 825A. The effect of either mistake was the same, and, as at King's Langley, nothing but continuous track circuiting will assuredly safeguard such a violation of the first principles of block working.

(2) I have no reason to doubt that the enginemmen of train No. 826 were on the alert, and therefore, I do not think that they can be criticised; they were fortunate to escape as they did, and it was still more fortunate that the engine was not derailed. I agree with the Chief Mechanical Engineer in thinking that, having regard to the results of the collision, the relative speed of the two trains was "*something between 50 and 55 m.p.h.*," viz., No. 825A was under steam accelerating at about 15 m.p.h., while No. 826, with the brake fully applied, overtook it at a speed of not less than 65 m.p.h.

In the rare event of such error on the part of the signalman, the second line of defence depends upon the vigilance of the driver and the efficiency of the tail light protecting the obstruction; the latter point has received considerable attention lately. I think the decision, taken in the case of this company as long ago as 1924, to dispense with the additional two side lights on passenger trains is to be regretted from the point of view that, in an emergency, such as occurred on this occasion, the *pattern* of three red lights is more easily recognisable than a single one, and thus provides a far

more conspicuous and arresting danger signal to a driver, who may be approaching at high speed and is unaware of the obstruction.

(3) In this case, as train No. 825A had not reached the track circuit—200 yd. long—in rear of the home signal when the second acceptance—for train No. 826—was given, apparently the accident would have been prevented had the controls on the block instrument by this track circuit been such that, once *line clear* has been transmitted, it could not have been transmitted a second time until the track circuit had been occupied and cleared. This should be combined with the company's normal equipment—which was not installed—by which the starting signal at Hatfield also would be released once only by each block acceptance. I recommend that consideration be given to this suggestion, with a view to the application of the additional control in suitable places, such as Welwyn Garden City, where such track circuits exist and where releases—which are objectionable—are not likely to be needed except to deal with emergencies. Modernisation of equipment at Hatfield also appears to be desirable, in view of the heavy and high-speed nature of the traffic; but, as already stated, the absence of the company's usual controls there had no bearing upon the accident. It is also desirable to record the fact that direct means, at the distant signal, of intermittent Automatic Train Control would not have had preventive effect.

(4) I have examined the arrangement of the block instrument shelf; the distance, centre to centre, between the instruments concerned is 3 ft. 6½ in., and they are satisfactorily situated with regard to the levers below them. The circumstances of this accident illustrate the desirability of giving general consideration to the best position, designation, and possibly to the colouring, of block instruments, in order to differentiate between them as much as possible; the only specific suggestion which I can make is that the difference in tone of block bells should be accentuated, or that indicator shutters should be fitted, a comparatively simple matter, to show which bell has sounded.

(5) As at King's Langley, this failure in block working was not safeguarded, as I think it might have been, by precise phraseology in the subsequent telephonic conversation between the signalmen concerned. While the use of this means of communication in connection with block working is permissible only in exceptional circumstances, I recommend definite prohibition, unless the conversation is formally phrased, is duly recorded in the registers of each of the signalmen concerned, and is therefore open to supervision. I suggest that the attention of the railway companies be drawn to this matter; it is noteworthy that in its standard block telegraph regulations, one company insists upon reference to the full description

of the train in circumstances such as those under consideration, and another company prescribes formal conversation in connection with Regulation 11, which deals with the action to be taken when a train is an unusually long time in the section.

(6) Besides the block bells, of which there are 11, and of which the tone is difficult to differentiate, frequent code signals on four of the five bells of the telephone circuits and on the five single needle telegraph instruments have to be interpreted by the signalman. There is no doubt that shortly before his breakdown Howes was interrupted by the telephone conversation with the porter about a matter—a passenger's missing parcel—which was entirely unconnected with his line of thought relative to train sequence. The porter was using Howes not merely as a telephone exchange operator, but as a transmitter of his inquiries; I understand that such procedure and the telephone switching arrangements are not uncommon.

In these circumstances, consideration appears to be necessary with regard to the provision of a telephone and booking lad to assist the signalman, and such assistance is provided here during holiday and rush periods. While this may not be justified on the night shift, which was the period concerned, I suggest that the signalman should be relieved of the distraction caused by the use of the telephone, except for operating purposes, by locating a switchboard in the booking office, by which local calls on traffic matters should be connected to a through circuit, without his intervention. I realise that this matter concerns the grading and pay of signalmen; but where the company has decided not to provide a telephone and booking lad, the removal, so far as is practicable, of all extraneous telephone operation from important signal boxes appears to be highly desirable.

(7) It was not alleged, as was the case at Stoke Works Junction in 1924,* that the disciplinary notice, which was received by signalman Howes when he came on duty, had any effect on his efficiency, and, of course, it would not have been handed to him had the district superintendent thought that any risk would have resulted. It is also true, I understand, that there was no departure from recognised practice, and the company's officers did not consider that paragraph 25 of their confidential instructions was contravened, the notice having been of a confirmatory character, and not in the nature of a first intimation of the punishment awarded. On principle, however, I recommend that in future all such notices—which state the charge and the punishment, and intimate the right of appeal—should be delivered to signalmen at the end of their turn of duty, particularly when a serious misdemeanour is concerned, as on this occasion.

* See THE RAILWAY GAZETTE, November 7, 1924.—ED. R.G.

(8) Apart from the foregoing remarks with regard to procedure, equipment, &c., Howes' failure, in my opinion, proved that although he had a good previous record, he was not really fit to shoulder the work—including the distractions—and responsibility attaching to Welwyn Garden City box. With regard to the selection by seniority for appointments of main line signalmen, strict regard is paid to the general suitability of applicants; but in this respect, however satisfactory a man's reports may be, it seems essential that the responsible officer, that is to say the district superintendent, or his assistant, should satisfy himself by personal contact before training is commenced, and certainly before the appointment is made. I understand that the company proposes to adopt procedure on these lines in future.

(9) The maintenance of the high standard of efficiency, which signalmen are expected to attain, is of great importance, having regard to the increasing intricacy of equipment, pressure of traffic, introduction of power working, and reduction in the number of boxes. The signalling school at Retford was closed about 1926, I presume on grounds of economy; it was for the training of porters and others as signalmen, and of lads in telegraphy, &c. While the company has a complete system of education, including signalling, for its clerical staff, I feel that the introduction of well-organised classes of lectures and/or correspondence courses for the wages grades would have a mind-broadening effect and be beneficial in facilitating the technical education of signalmen, while affording means for intercourse and exchange of ideas between officers and staff.

(10) With regard to the behaviour of the rolling stock in this serious collision, the outstanding feature was the service rendered by the buckeye coupler, as a safeguard against telescoping, in its application, with Pullman vestibules, to heavy steel underframes. The results indicated that this coupler, with its rubber buffering, was instrumental in preventing a heavier casualty list in the rear coaches of train No. 825A and in the leading coaches of No. 826. The last vehicle, No. 141, of the former train bore the main shock, and it would obviously be impracticable to provide any type of coach to resist forces of the magnitude which must have been involved. Further, the suitability and security of this coupler were illustrated by the fact that the intermediate vehicles of train No. 826, which were not so fitted, became separated and wrecked, and were responsible for the partial telescoping of the third coach of this train.

Since 1896 all new corridor stock, both for the Great Northern and East Coast services, has been fitted with buckeye couplers and Pullman vestibules; steel underframes were not adopted for such stock until 1905. There still remains, however, a proportion of corridor stock, built prior to

1923 by the other constituent companies of the group, which was not fitted with this coupler, and some of it also is not provided with electric lighting. The Chief Mechanical Engineer informed me that an increased programme of construction is now being undertaken, and I strongly recommend acceleration in this respect; it affords

the principal means by which fuller use of both features—the buckeye coupler and electric lighting—can be attained. Re-equipment of this nature has also the advantage that expenditure thereon is related to mobile and revenue earning assets, while, at the same time, it affords immediate benefit to various industries.

The Silver Jubilee Train, L.N.E.R.

Regarding the full account published in last week's issue of the London & North Eastern Railway's Silver Jubilee streamlined engine and train, which is to be put into regular service on Monday next, September 30, the Lord Mayor of Newcastle, with the Mayor of Darlington, will travel on the train on the inaugural trip with their ladies, and the Lord Mayor of London, together with his lady and the Sheriffs and their ladies, have kindly consented to meet the train at King's Cross station and receive the civic dignitaries from the North.

The train will be available for the use of ordinary ticket holders, but owing to its special character and the limited accommodation available, a small supplementary charge will be made of 5s. first class and 3s. third class.

The most notable features of the schedule of this run are (1) that in spite of a number of speed restrictions—some of them as severe as 10, 15, and 30 m.p.h.—the London-Darlington run is covered in both directions at 70.3 m.p.h., start to stop; and (2) that as there are long adverse gradients, such as the 9-mile climb mostly at 1 in 200 and 1 in 178 up to Stoke box, high uphill speeds are essential and the schedule is framed accordingly. For instance, the 29 m. 7½ ch. from Peterborough to Grantham, in which this 9-mile ascent occurs, are booked to be

covered in 24½ min. (speed 71.3 m.p.h.), whereas 24 min. are allowed for the same stretch in the opposite direction, even though the grading is so much more favourable. High downhill speeds are, therefore, not encouraged.

In actual point of fact, it is reported that in the course of preliminary trials, the Peterborough-Grantham run has already been covered in 26 min. start to stop, the ultimate speed on the 1 in 178 rising grade at Stoke box being 72 m.p.h. Thus the *Silver Link*, the first of the new engines for this run, though only a fortnight out of shops upon completion, has accomplished what is equivalent to covering this distance in 24½ min. from passing Peterborough (albeit slowly) to passing Grantham, and maintained a speed at the end of a climb through 275 ft. vertically, of nearly 2 m.p.h. higher than the average required throughout the whole King's Cross-Darlington run. That high downhill speeds are attainable in case of emergency is proved by the same engine having covered six miles at an average of 100 m.p.h., but such speeds are not anticipated in the ordinary course of running. It is remarkable that so new an engine should be capable of them without lubricating or other troubles, and these feats speak volumes for Mr. Gresley's design and for the meticulous care bestowed upon every detail of workmanship in Doncaster works.

Forthcoming Events

- Oct. 1 (Tues.).—L.N.E.R. (Newcastle and Sunderland) Lecture and Debating Society, at Newcastle, 7 p.m. "Norway—The Land of Nightless Days," by Mr. Cecil J. Allen.
Retired Railway Officers' Society, at Abercorn Rooms, Liverpool Street, London, E.C.2, 2.30 p.m. Ordinary Meeting.
- Oct. 2 (Wed.).—Permanent Way Institution (Leeds), at Quebec House, Quebec Street, 7.30 p.m. "Some Permanent Way Problems," by Mr. R. Gurd.
- Oct. 2-12.—International Exhibition of Inventions, at Central Hall, London, S.W.1.
- Oct. 7 (Mon.).—Institution of Mechanical Engineers (Graduates), Storey's Gate, London, S.W.1, 6.45 p.m. "Early Gearing," by Mr. R. Wailes.
- Oct. 8 (Tues.).—Federation of N.E. Area Lecture and Debating Societies, at York, 7 p.m. "Palestine," by Mr. C. M. Jenkin Jones.
Permanent Way Institution (Sheffield), at Royal Victoria Hotel, 7 p.m. "Activities at Redbridge Permanent Way Shops and Sleeper Depot," by Mr. S. G. Reed.
- Oct. 9 (Wed.).—Institution of Railway Signal Engineers, at Inst. of Electrical Engineers, Savoy Place, London, W.C.2, 6 p.m. Ordinary Meeting.
Permanent Way Institution (London). "The Design of Retaining Walls," by Mr. H. Savage.

- Oct. 10 (Thurs.).—Institution of Locomotive Engineers (London), at Inst. of Mechanical Engineers, Storey's Gate, S.W.1, 6 p.m. Informal Meeting.
Southern Railway (London) Lecture and Debating Society, at Chapter House, St. Thomas's Street, S.E.1, 5.45 p.m. "The Development of Air Communications," by Mr. G. O. Waters.
- Oct. 11 (Fri.).—Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, 7 p.m. Election of Sub-Committee.
Railway Club, at Royal Scottish Corporation Hall, Fetter Lane, London, E.C.4, 7.30 p.m. Lecture by Mr. H. W. Bardsley on some well-known British railway accidents.
- Oct. 12 (Sat.).—Permanent Way Institution (Manchester-Liverpool), at Temperance Inst., Southport, 3 p.m. "With a Camera in the Sudan," by Mr. C. A. Greenwood.
- Oct. 14 (Mon.).—Institute of Transport (London), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 5.30 p.m. Opening Meeting and Presidential Address by Sir Cyril Hurcomb, K.B.E., C.B.
- Oct. 15 (Tues.).—Institute of Transport (London), at Inst. of Electrical Engineers, Savoy Place, W.C.2, 6 p.m. "Railway Transport in the Dominions," by Mr. A. W. Arthurton.
- Oct. 18 (Fri.).—Institution of Mechanical Engineers. Annual Dinner.

NOTES AND NEWS

Railway Rates Tribunal: New Address.—On and from September 30 the address of the Railway Rates Tribunal will be Bush House, Aldwych, W.C.2 (Telephone, Temple Bar 9284; telegraphic address, Railtrib, Bush, London). The new office will be in the North West wing, third floor.

Dover, St. Margarets and Martin Mill Light Railways Order.—The Minister of Transport has extended to October 11, 1936, the period limited for the completion of the whole of the railway authorised by the Dover, St. Margarets and Martin Mill Light Railways Order, 1909.

Scottish Railway Broadcast.—A footplate interview with the engine crew of the Night Scot will be broadcast from the B.B.C. Scottish Regional station at 10.20 p.m., on October 3.

The interview and commentary, which will deal with the run from Glasgow to Crewe from the enginemens' point of view, will be relayed from the locomotive as it stands with its train at No. 2 platform, Glasgow Central station.

New U.S.S.R. Lines.—It is reported that two important new lines designed to facilitate the transport of the heavy mineral traffic in the Kazakstan and Lake Balkhash districts are almost completed. The first is 300 miles long and runs from Karaganda to Kounrad, and the second, 150 miles long, connects Rubtsovka and Kamenogorsk. Another line is being built along the Caucasian shore of the Black Sea in order to avoid the present roundabout route from Batum to the Donbass and Central Russia. This line will run from Batum to Tuapse, and the Batum-Sukhum

section, 100 miles long, is due for completion at the end of the year. Under consideration is an important north and south line, 290 miles long, to connect Smolensk with Velikiy Novgorod, near Leningrad.

Transmission Belting.—We have received a specimen of a new patented type of the well-known Teon driving belt, in which increased flexibility is attained by the use of transverse instead of longitudinal stapling. The natural flexibility of the fabric is thus given full play. The Teon belt is manufactured by Fleming, Birkby & Goodall Limited, 1, Broad Street Place, E.C.2.

Automatic Couplers.—The Scharfenbergkupplung A. G., of Berlin, has on exhibition at the German Railway Centenary Exhibition at Nuremberg several examples of the Schaku automatic coupler, which was described in the *Diesel Railway Traction Supplement* for December 28, 1934. This multi-purpose

coupling is used in various forms on diesel and electric vehicles, on 50-ton goods wagons belonging to the Reichsbahn, and on the high-speed Borsig steam locomotive, where the distance between the coupled vehicles has been reduced to 9½ in.

Monument Station.—The City Corporation of London, in conjunction with the London Passenger Transport Board, has been engaged for some months past in constructing pedestrian subways in front of the Monument station. The work has progressed so far that the opening has been fixed for December 2, when the Lord Mayor of London will perform the ceremony. The Lord Chief Justice, the Minister of Transport, Lord Ashfield, and Lord Snell have arranged to be present.

Londonderry & Lough Swilly Wages.—Cessation of the percentage deduction from wages of workers of the Londonderry & Lough Swilly Railway Company was the claim considered by representatives of the three railway trade unions in London on September 23 when they met representatives of the directors of the railway. An official statement issued at the close was to the effect that the representatives of the company undertook to consider the matter with the board of directors, after which a further meeting would be held.

Best-Kept Stations, L.N.E.R.—Prizes in the Best-Kept Stations Competition, L.N.E.R. (Scottish Area) have been awarded to the following:—

Special Class A: Burgh-by-Sands, Helensburgh, Lennoxtown, St. Monans.

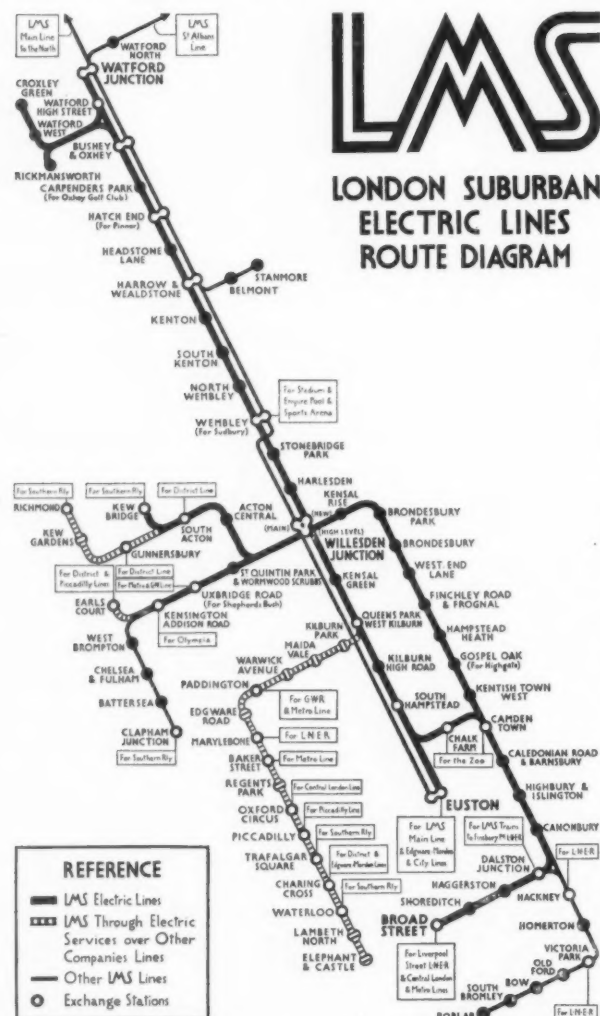
Special Class B: Kilsyth (Old), Newcastle-on-Sea, Reedsmouth, St. Cyrus.

First Class: Bearsden, Bellingham (North Tyne), Bridge of Earn, Drumburgh, Dundee (East), Gilnockie, Grahamston, Hyndland, Kilpatrick, Largo, Newburgh, Newport (East), Shandon, Shankend.

Twenty-eight stations have been awarded second class prizes, thirty-seven third class, and twenty-nine fourth class.

Closing of Leek-Waterhouses Branch, L.M.S.R.—The Leek-Waterhouses branch of the L.M.S.R., opened in 1905, is to be closed for passenger traffic after Saturday next, September 28. The line was constructed by the old North Staffordshire Railway to connect Leek with the Manifold Valley Light Railway, which was opened between Waterhouses and Hulme End in 1904 and abandoned in March, 1934. In recent years there has been only one class of travel over the line, which has been served by two trains daily in each direction, Sundays excepted.

Grand Trunk Senior Stocks.—The terms of a proposed settlement of the claims of the Grand Trunk Senior Stocks Company against the Canadian Government are announced by Mr. R. C. Hawkin, Chairman of the company. The stockholders' claim for compensation is in respect of the capital of the 6 per cent. prior lien bonds, plus 6 per cent. cumulative interest for the



An effective poster designed by Mr. George Dow, showing in diagrammatic form the L.M.S.R. London suburban electric services

past 15½ years. The interest now amounts to more than 140 per cent., so that the stockholders' claim is for £240 per £100 bond. The board states it is prepared to recommend holders of first preference stocks to abate 25 per cent. of the claim and to accept £180 in settlement. The board also recommends that the second preference stockholders should abate 50 per cent. of their claim and accept £120 in settlement. Should a settlement be achieved on the proposed basis, Canada would then pay about the same as she would have paid on the offer made by the Borden Government on the advice of Sir Henry Drayton and the Royal Commission of 1917.

Austro-Hungarian State Railway Company.—The Council of Foreign Bondholders has received advice from the Caisse Commune that on and after September 5 coupons due on September 1, 1935, from bonds of the Austro-Hungarian Chartered State Railway Company (S.T.E.G.) 3 per cent. Old and Complementary Systems stamped

under the Accord of Prague will be paid at the various Continental agents at the rate of French fr. 7·70. The partial or total suspension of amounts due by Roumania, Hungary, and Yugoslavia prevent the full payment due on the coupons being made; the unpaid portion, amounting to French fr. 2·639 on each coupon, will remain incorporated in the bond with a view to eventual settlement.

Road Accidents.—The Ministry of Transport return for the week ended September 21, of persons killed or injured in road accidents is as follows. The figures in brackets are those for the corresponding period of last year:—

	Killed, including deaths resulting from previous accidents		Injured	
England	126	(143)	4,166	(4,365)
Wales ...	9	(2)	185	(186)
Scotland	20	(16)	411	(489)
	155 (161)		4,762 (5,040)	

The total fatalities for the previous week were 153, as compared with 159 for the corresponding period of last year.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 38th Week			Totals to Date		
	1935	1934	Inc. or Dec.	1935	1934	Inc. or Dec.
L.M.S.R. (6,925½ mls.)						
Passenger-train traffic...	491,000	513,000	— 22,000	19,030,000	18,640,000	+ 390,000
Merchandise, &c. ...	473,000	459,000	+ 14,000	16,832,000	16,745,000	+ 87,000
Coal and coke ...	231,000	219,000	+ 12,000	8,538,000	8,530,000	+ 8,000
Goods-train traffic ...	704,000	678,000	+ 26,000	25,370,000	25,275,000	+ 95,000
Total receipts ...	1,195,000	1,191,000	+ 4,000	44,400,000	43,915,000	+ 485,000
L.N.E.R. (6,336 mls.)						
Passenger-train traffic...	331,000	334,000	— 3,000	12,383,000	12,093,000	+ 290,000
Merchandise, &c. ...	324,000	320,000	+ 4,000	11,604,000	11,625,000	— 21,000
Coal and coke ...	219,000	235,000	— 16,000	8,293,000	8,529,000	— 236,000
Goods-train traffic ...	543,000	555,000	— 12,000	19,897,000	20,154,000	— 257,000
Total receipts ...	874,000	889,000	— 15,000	32,280,000	32,247,000	+ 33,000
G.W.R. (3,749½ mls.)						
Passenger-train traffic...	221,000	225,000	— 4,000	8,079,000	7,941,000	+ 138,000
Merchandise, &c. ...	186,000	186,000	— 0	6,800,000	6,756,000	+ 44,000
Coal and coke ...	96,000	112,000	— 16,000	3,684,000	3,762,000	— 78,000
Goods-train traffic ...	282,000	298,000	— 16,000	10,484,000	10,518,000	— 34,000
Total receipts ...	503,000	523,000	— 20,000	18,563,000	18,459,000	+ 104,000
S.R. (2,171 mls.)						
Passenger-train traffic...	327,000	320,000	+ 7,000	11,787,000	11,458,000	+ 329,000
Merchandise, &c. ...	64,500	69,000	— 4,500	2,305,000	2,447,500	— 142,500
Coal and coke ...	30,500	31,000	— 500	1,111,000	1,163,500	— 52,500
Goods-train traffic ...	95,000	100,000	— 5,000	3,416,000	3,611,000	— 195,000
Total receipts ...	422,000	420,000	+ 2,000	15,203,000	15,069,000	+ 134,000
Liverpool Overhead ...	1,128	1,156	— 28	45,490	43,902	+ 1,588
Mersey (4½ mls.)	3,947	3,987	— 40	152,274	154,846	— 2,572
*London Passenger Transport Board ...	546,500	538,000	+ 8,500	6,455,400	6,362,900	+ 92,500
IRELAND						
Belfast & C.D. pass. (80 mls.)	2,514	2,638	— 124	102,382	101,300	+ 1,082
" " goods	486	549	— 63	18,902	19,418	— 516
" " total	3,000	3,187	— 187	121,284	120,718	+ 566
Great Northern pass. (543 mls.)	10,700	10,900	— 200	413,850	393,750	+ 20,100
" " goods	10,100	9,200	+ 900	342,600	325,950	+ 16,650
" " total	20,800	20,100	+ 700	756,450	719,700	+ 36,750
Great Southern pass. (2,124 mls.)	25,240	24,079	+ 1,161	968,960	942,305	+ 26,655
" " goods	38,186	35,814	+ 2,372	1,286,756	1,209,325	+ 77,431
" " total	63,426	59,893	+ 3,533	2,255,716	2,151,630	+ 104,086

* 12th week, the receipts for which include those undertakings not absorbed by the L.P.T.B. in the corresponding period last year; last year's figures are, however, adjusted for comparative purposes

British and Irish Railways Stocks and Shares

Stocks	Highest 1934	Lowest 1934	Prices	
			Sept. 25, 1935	Rise/ Fall
G.W.R.				
Cons. Ord. ...	661½	481½	47	—1½
5% Cons. Prefce. ...	118	109	110½	—2
5% Red. Pref. (1950) ...	115	107	108½	—
4% Deb. ...	117	105	109½	—2½
4½% Deb. ...	119	109	114½	—1
4½% Deb. ...	129½	115¼	119½	—2
5% Deb. ...	135	126¼	133½	—
2½% Deb. ...	75	64	72	—1
5% Rt. Charge ...	1347½	123¼	130½	—
5% Cons. Guar. ...	132¾	121¾	122½	—1
L.M.S.R.				
Ord. ...	301½	191½	171½	—1½
4% Prefce. (1923) ...	64¼	41	50	—1
4% Prefce. ...	87	69½	77½	—1½
5% Red. Pref. (1955) ...	107	92½	99½	—1
4% Deb. ...	114½	100½	101½	—1½
5% Red. Deb. (1952) ...	1181½	111¼	114½	—1
4% Guar.	106½	96¾	97½	—1
L.N.E.R.				
5% Pref. Ord. ...	24¾	13½	9¼	—1¼
Def. Ord. ...	11½	678	5¼	—
4% First Prefce. ...	76	59½	53	—2
4% Second Prefce. ...	47	25½	20	—1½
5% Red. Pref. (1955) ...	94½	80	75½	—2
4% First Guar. ...	104	92	96	—1
4% Second Guar. ...	9778	86½	85½	—2
3% Deb. ...	90	74½	76½	—1½
4% Deb. ...	114	99¼	100	—2
5% Red. Deb. (1947) ...	117	108	109½*	—3
4½% Sinking Fund Red. Deb. ...	111¼	105¼	110	—
SOUTHERN				
Pref. Ord.	90	63½	75	—2
Def. Ord. ...	3258	19	18½	—
5% Prefce. ...	1185½	107½	110½	—2
5% Red. Pref. (1964) ...	115¾	107½	110½	—3
5% Guar. Prefce. ...	132	120¾	123½	—2
5% Red. Guar. Pref. (1957) ...	119½	113	114½	—1
4% Deb.	116½	103¼	109	—2
5% Deb. ...	134	124½	133½	—
4% Red. Deb. ...	1131½	1059½	109½	—2
BELFAST & C.D.				
Ord. ...	6	5	8½	—
FORTH BRIDGE				
4% Deb. ...	110	100	105½	—2
4% Guar. ...	110	100	104½	—2
G. NORTHERN (IRELAND)				
Ord. ...	9¾	416½	16	—1½
G. SOUTHERN (IRELAND)				
Ord. ...	25	12½	40½	—
Prefce. ...	21½	131½	44½	—
Guar. ...	48	39	78½	—
Deb. ...	67	59	77½	—1½
L.P.T.B.				
4½% "A" ...	126	115	122½	—
5% "A" ...	135½	124½	131½	—1
4½% "T.A." ...	113½	107½	109	—2
5% "B" ...	131½	118	127½	—
"C" ...	97	73	100	—2
MERSEY				
Ord. ...	15¼	7	11	—
4% Perp. Deb. ...	93½	82½	94½	—
3% Perp. Deb. ...	66½	61½	70½	—1
3% Perp. Prefce. ...	54	44½	52½	—

CONTRACTS AND TENDERS

The Associated Equipment Co. Ltd. has received an order from the London Passenger Transport Board for 200 664T type trolleybuses.

Locomotive Turntables for L.M.S.R.

Ransomes & Rapier Limited has received an order for a total of four 60-ft. dia. vacuum-operated Mundt locomotive turntables for installation at Bletchley, Derby, Goole, and Nottingham.

The L.M.S.R. announces that it has been decided to instal larger diameter turntables as follow:—Two of 70 ft. at Aintree and Camden; six of 60 ft. at Bletchley, Derby, Goole, Mold Junction, Windermere, and Southport; and one of 55 ft. at Derby. These new turntables will all be of the articulated type, and three new tables of this type will be provided to displace three balanced type turntables at Perth (70 ft.), Nottingham (60 ft.), and Canklow (55 ft.), which require renewal.

It is also announced that 70 existing turntables at L.M.S.R. locomotive depots are to be fitted with vacuum-operated turning gear. This gear, an example of which, it will be recalled, has been fitted to the turntable at King's Cross, L.N.E.R., is manufactured by Cowans, Sheldon & Co. Ltd. Booster pumps to enable adequate water pressure to be available for the washing-out of locomotive boilers are also to be installed at a large number of engine sheds.

The motive power depot at Wakefield is to have further improvements effected in the layout of the yard, including increased ashpit accommodation, to facilitate in the rapid disposal of engines after arrival at the shed.

L.N.E.R. Orders for Road Vehicles

The L.N.E.R. has placed contracts for additional road vehicles as follow:—

Vauxhall Motors Limited, three 30-cwt. Bedford motor vehicles, six 40-cwt. Bedford motor vehicles, two 60-cwt. Bedford motor vehicles, and five 2-ton Bedford short wheelbase chassis and cabs, with vacuum reservoirs;

Unwins (York) Limited, three 20-cwt. Ford parcels vans;

Stewart & Arden Limited, two 30-cwt. Morris parcels vans;

Truck & Tractor Appliance Co. (Manchester) Ltd., five 3-ton trailers with platform bodies, five 3-ton trailers (chassis only), and five sets coupling and brake control gear;

Rootes Limited, six 3-ton Karrier Cob Junior tractors;

Latil Industrial Vehicles Limited, one reconditioned K.F.L. Latil tractor;

John I. Thornycroft & Co. Ltd., three 1½-ton motor vehicles;

Cranes (Dereham) Limited, 82 trailers for motor vehicles, various types;

Scammell Lorries Limited, 11 Trivan chassis with flat platform bodies, 27 3-ton mechanical horse tractors, nine 6-ton mechanical horse tractors, 51 3-ton low loading trailers, five 6-ton trailers, two 3-ton timber carriers, and one 6-ton timber carrier, also 80 sets coupling gear and sundry barrel slides;

Morris Commercial Cars Limited, one 30-cwt. low-loading motor vehicle;

Car Mart Limited, four 10-cwt. Austin parcels vans.

The L.N.E.R. has also placed orders for plant and equipment for the laundry at Colchester which deals with the requirements of the L.N.E.R., Southern Area hotels, refreshment rooms, tea rooms, restaurant cars, Continental steamships, trainmen's dormitories and sleeping cars. The orders are as follow:—

Baker, Perkins & Co. Ltd., press; Culver Heating Co. Ltd., alterations to pipe line; Central Electric Co. Ltd., alterations to electric wiring.

The Swiss Locomotive & Machine Works is completing an order for six 108-ton 2-8-2 steam locomotives for main line passenger service on the Bulgarian State Railways. The design is similar to that of the locomotives built by Borsig four years ago.

Tank Wagons for India

Hurst, Nelson & Co. Ltd. has received orders from the Assam-Bengal Railway for 20 metre-gauge petrol tank wagons of 5,500 gall. capacity, and 10 metre-gauge four-wheeled oil tank wagons of 2,800 gall. capacity.

J. Booth & Bros. Ltd. has received an order for one 30-ton overhead electric travelling crane for the Buenos Ayres Great Southern Railway.

Railcar Engines and Torque Converters for New Zealand.

Leyland Motors Limited has received a further order for seven hydraulic railcar units, each to consist of engine and torque converter, to form a unit assembly, and the controls and driving axle gearing to be built into railcars to be constructed by the New Zealand Government Railways own workshops. These railcars are required for the New Plymouth service on the Rimutaka mountain range route where the steepest gradients vary from 1 in 14 to 1 in 12, and where there are five-chain radius curves. Special cooling systems suited to these conditions will be adopted both for the torque-converter fluid and for the engines. The earlier order placed with Leyland Motors by the same railway for similar units was recorded in this column in our issue of June 28 last.

Taylor Bros. & Co. Ltd. has received an order from the Crown Agents for the Colonies for 1,000 pairs of wheels and axles required for Sudan Railways stock.

The Gloucester Railway Carriage & Wagon Co. Ltd. has also received an order from the Crown Agents for the Colonies for four third-class coach underframes for the Sudan Railways.

United Water Softeners Limited has received an order for twenty-seven Zerolit water softening plants for the Buenos Ayres Great Southern Railway.

The Bengal-Nagpur Railway Administration has placed orders with William Beardmore & Co. Ltd. for 50 steel axles; Owen & Dyson Limited for 100 disc wheels; and the Tees-side Bridge & Engineering Co. Ltd. for 1,500 drawbars.

Svenska Entreprenadaktiebolaget, Sweden, has received an order from the Iranian (Persian) Government for the construction of large railway workshops at Tabriz and a sugar mill near the same town, learns Reuters Trade Service from Stockholm. The company has

already carried out a large number of works of different kinds in Iran.

The Estonian State Railways Administration is proposing to increase the use of diesel railcars during the next three years, and for the construction of these and a small number of steam locomotives, the Estonian Government has been asked for a grant of Kr. 1,980,000.

The Chief Controller of Stores, Indian Stores Department (Engineering Section), invites tenders, receivable by October 24, for a total of 97,800 fishbolts and nuts and 1,040,000 dogsplikes required for the Eastern Bengal Railway.

The Chief Controller of Stores, Indian Stores Department (Engineering Section), Simla, invites tenders, receivable by October 22, for ten Sheffield-Twinberrow welded bogies for 68-ft. underframes, complete with wheels and axles and Skefko bearings.

GENERAL PORTERS' BENEVOLENT ASSOCIATION.—Mr. James Paterson, of Carter, Paterson & Co. Ltd., on September 18 conferred with the stewards who are to assist him in his capacity as Appeal President (1935-36) for the General Porters' Benevolent Association. Among the functions to be held in aid of the appeal is a festival ball and cabaret at the Royal Opera House, Covent Garden, on October 29.

THE BRISTOLIAN.—In the period, Thursday, September 12, to Tuesday, September 24, inclusive, the Bristolian, running in the down direction, was from 1 to 2½ min. early at Bristol on six occasions, and was late on the other three by ½, 1, and 8 min., the latter figure being the result of a derailment, necessitating single line working, near Swindon. In the up direction the train was only once late and then by but half-a-minute, and on the other eight occasions was exactly to time five times, and 1 or 2 min. early on the other three days. The record is therefore quite satisfactory, and, but for the unforeseen delay due to the derailment, net time gained upon schedule was 12 min. in the 18 runs. The load was one of 7 coaches or 218 tons daily.

WAGE CUTS RESTORATION CLAIM.—At a joint meeting on Wednesday, September 25, of the executives of the National Union of Railwaymen, the Associated Society of Locomotive Engineers and Firemen, and the Railway Clerks Association, it was agreed that representations should be made to the railway companies for a restoration of the balance of the percentage wage deductions made in 1931, and also the restoration of the variation in the rates for overtime, night duty and Sunday work, in regard to the traffic grades, and the clerical and supervisory staffs represented by the three unions. These cuts were stated to represent a reduction of £4,284,000 a year. The partial restoration operating as from October, 1934, was said to represent a recovery in wages and conditions of about £1,186,300.

OFFICIAL NOTICES

The Institute of Transport Examinations, 1936

NOTICE IS HEREBY GIVEN that the Graduateship and Associate Membership Examinations will be held in London and other centres on Thursday, Friday and Saturday, April 30th, May 1st and 2nd, 1936.

The latest date for the deposit of forms of entry which can be obtained after October 1st, 1935, is March 1st, 1936 (January 1st if any exemptions are claimed). Full particulars, previous question papers (price 1s. per set, post free) and copies of the booklet "The Institute of Transport Examinations: notes for the guidance of candidates unable to attend preparatory courses" (price 2s. 6d. post free) may be obtained from the undersigned.

By Order of the Council,

A. WINTER GRAY,
Secretary.

15, Savoy Street,
London, W.C.2.
August 26th, 1935.

Bengal-Nagpur Railway Company Limited

THE Directors are prepared to receive Tenders for:—

954 STEEL TYRES.

Specification and Form of Tender can be obtained from the Company's Offices, 132, Gresham House, Old Broad Street, London, E.C.2, on or after Wednesday, 25th September, 1935.

A fee of 10s. will be charged for each copy of the specification, which is NOT returnable. Tenders must be submitted not later than NOON on Monday, 14th October, 1935.

The Directors do not bind themselves to accept the lowest or any Tender, and reserve to themselves the right of reducing or dividing the order.

By Order of the Board,

T. R. WYNNE,
Managing Director.

Central Argentine Railway Limited

NOTICE is hereby given that the transfer Books of the Company will be closed from 2nd to 16th October, 1935, both days inclusive.

F. FIGHIERA,
Secretary.

3a, Coleman Street,
London, E.C.2.
25th September, 1935.

Universal Directory of Railway Officials and Railway Year Book

41st Annual Edition, 1935-36

JUST ISSUED

Price 20/- net.

THE DIRECTORY PUBLISHING CO. LTD.,
33, Tothill Street, London, S.W.1.

RAILWAY AND OTHER REPORTS

Central Argentine Railway.—The directors have decided to pay the balance of the dividend declared in November, 1933, on the $4\frac{1}{2}$ per cent. preference stock. Warrants will be posted on October 4 to holders registered on October 31, 1933. The full dividend declared in November, 1933, was announced to be payable when sufficient funds in cash were available in England. One half of the dividend was paid in November, 1934.

Zeeland Steamship Company.—

The 60th annual report of this company shows a fall in receipts from 1,743,000 fl. in 1933 to 1,680,706 fl., notwithstanding an increase of 21 per cent. in the number of passengers carried (from 66,193 to 80,287), something not experienced for over 20 years. Goods traffic declined 14.5 per cent., only 12,635 tonnes being conveyed. Postal traffic, in 265,459 bags, remained substantially the same, but receipts were less on account of new rates having been agreed on with the Netherlands Government. The takings of the Flushing Hotel also declined. The same three vessels continued in service as before. Operating profits were 318,149 fl., against 283,104 fl., and the nett profit, after all charges were met, was 63,569 fl. against 17,266 fl. in 1933.

Cordoba Central Railway.—

The company being still unable to resume the payment of interest on its $4\frac{1}{2}$ per cent. first debenture stock, the board has decided, with the concurrence of the trustees, pursuant to the powers in that respect conferred upon the company by the scheme of arrangement sanctioned by the court on July 25, 1932, to postpone until April 1, 1936, or until such later date as may with the concurrence of the trustees hereafter be determined, payment of the half-year's instalments of interest on the company's first debenture stock which fell due on October 1, 1934, and April 1, 1935, respectively, as well as of the further half-year's in-

stalment of such interest which falls due on October 1, 1935. Although for the year ended June 30, 1935, there was a small increase in the gross receipts in Argentine currency, and some decrease in expenses, the exchange loss on remittances was much greater than in the previous year. It is expected that the report and accounts will be ready for issue in the early part of November next.

Sorocabana Railway.—

The $5\frac{1}{2}$ per cent. first debenture holders' advisory committee of the Sorocabana Railway Company announces that the balance of accumulated revenue funds in sterling available for distribution on account of the coupon due on October 1, 1935, on the £1,490,840 first debentures amounts to £15,565, and has fixed the interest which will be payable on and after October 1 at 1 per cent., leaving £657 to be carried forward.

United Steel Companies Limited.

—The report for the year ended June 30 states that the demand for the products manufactured by the company was well maintained throughout the year and still continues. The output of steel has remained at the high level reached in the previous year. The profit and loss account shows a balance on trading of £1,243,981. After making deductions for directors' fees, interest, and income-tax there is a balance of £1,115,205, which is comparable with the profit of £947,680 in the accounts of the previous year. The directors have transferred £275,000 (unchanged) to the central reserve for depreciation and have placed £220,000 (against £150,000) to reserve for taxation. The directors have placed to general reserve the sum of £200,000, an exceptional credit which became available during the year, and they have also transferred to this reserve £100,000 from the profits of the year (against nil), making a total of £300,000. It is proposed to pay on October 26 a final dividend of $4\frac{1}{2}$ per cent., making a total

distribution for the year of 7 per cent. (against $5\frac{1}{2}$ per cent.), the balance forward then being raised from £446,037 to £521,305. The new coke oven plants at the Rother Vale and Workington branches are in course of construction; the former should be in operation at the beginning of next year and the latter by next midsummer. The consolidation of the loan capital of the company and its subsidiary companies was carried out in the autumn of 1934. The saving in interest resulting from this consolidation has been £22,443 in the year covered by the accounts; next year it will be £34,115. As a result of this consolidation the loan capital of the company has been increased from £1,300,000 to £2,500,000, but the loan capital of the subsidiary companies has been redeemed; the only subsidiary company secured loan now being £100,000 perpetual debenture stock of Samuel Fox & Co. It is proposed to convert the share capital into stock.

Thos. W. Ward Limited.—

The profit for the year ended June 30 was lower at £97,137 (against £106,826 for 1933-34), but as only £5,786 is written off out of revenue for depreciation, against £31,757 for 1933-34, the net profit shows expansion from £75,068 to £91,351. The directors have already paid the year's first preference dividend (including that on the 350,000 shares issued in November, 1934) and $1\frac{1}{2}$ years' arrears of dividend to June 30, 1934, on the second preference and employees' shares, and have written £2,366 off new issue expenses. They now propose to pay the balance of dividend arrears on the second preference and employees' shares, being for one year to June 30 last, and the balance forward will be raised from £34,721 to £40,531. In addition to depreciation of £5,786 written off out of revenue, £11,745 has been written off out of capital reserve, making a total of £17,531.

Vulcan Foundry Limited.—

The directors recommend an ordinary dividend of $2\frac{1}{2}$ per cent., not subject to tax, for the year ended June 30 (against 2 per cent. a year ago).

Railway Share Market

The stock and share markets commenced the week with a much more confident tone. Home railway stocks, which had followed the gilt-edged security market downward in the latter part of last week, showed a good, although not full, recovery. Many of the bargains recorded in London Midland & Scottish ordinary were attributed to closing of bear commitments at the reduced level, whilst a proportion at least of the buying which caused Southern deferred stock to rise sharply was due to option buying, which necessitates a proportion of stock also being purchased by the option dealer to "cover" his liability.

A three months' option on Southern deferred stock costs about 30s. per cent.,

in addition to which there is commission to the broker arranging the option. It means that the stock has to rise about three points before the purchaser commences to see any profit on the transaction. This is equivalent to a 15 per cent. rise within six Stock Exchange accounts, and unless markets are very active and strong such a rise in price is unusual. For this reason private investors should consider carefully the risks of buying options on stock. They are of value as "cover" to professional investors or dealers in stocks who "job" in and out of stock against bargains carried through in the market at a profit of a fraction per cent., but for the private investor options on home railway

stocks may well be described as a "delusion and a snare." Traffic returns issued on Wednesday were of mixed and disappointing character. They had little influence on prices of home railway junior stocks, which, as explained above, are at the moment subject to technical market influences.

Foreign railway stocks were less active, and interest in Cordoba Central issues dwindled in the absence of any fresh news or rumours about Argentine Government negotiations. The buoyant price of wheat was not reflected in corresponding activity in Argentine railway stocks, because it is off-set by fears of a short crop in the wheat-growing areas. San Paulo ordinary gave way a few points on the offer of stock following the passing of the interim dividend. Current market estimates of dividend for the year are inclined to be pessimistic. Nitrate Railways shares reacted after an early advance.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1934-35	Week Ending	Traffic for Week			No. of Weeks	Aggregate Traffic to Date			Shares or Stock	Prices						
			Total this year	Inc. or Dec. compared with 1934	£		Totals		Increase or Decrease		Highest 1934	Lowest 1934	Sept. 25, 1935	Yield % (See Note)			
							This Year	Last Year									
South & Central America.	Antofagasta (Chili) & Bolivia	830	22.9.35	9,070	-	2,650	38	462,930	535,220	-	72,290	Ord. Stk.	265 ⁴	19	19	Nil	
	Argentine North Eastern ..	753	21.9.35	9,013	+	1,730	12	100,595	94,473	+	6,122	A. Deb.	11	67 ⁸	4	Nil	
	Argentine Transandine ..	111	—	—	—	—	—	—	—	—	—	6 p.c. Deb.	52	45	48	85 ⁶	
	Bolivar ..	174	Aug., 1935	5,600	+	300	35	50,300	49,150	+	1,150	Ord. Stk.	10	61 ²	10	Nil	
	Brazil ..	—	—	—	—	—	—	—	—	—	—	Bonds.	135 ⁴	107 ¹⁶	13	31 ¹⁵	
	Buenos Ayres & Pacific ..	2,806	21.9.35	70,581	+	3,817	12	860,896	838,465	+	22,431	Ord. Stk.	161 ²	81 ²	7	Nil	
	Buenos Ayres Central ..	190	7.9.35	\$136,500	+	\$14,600	10	\$1,239,900	\$1,354,900	+	\$115,000	Mt. Deb.	23	10	16	Nil	
	Buenos Ayres Gt. Southern ..	5,085	21.9.35	129,243	+	10,409	12	1,427,415	1,473,914	+	46,499	Ord. Stk.	35	22	191 ²	Nil	
	Buenos Ayres Western ..	1,930	21.9.35	38,403	+	3,418	12	479,787	498,522	+	18,735	"	271 ²	181 ²	16	Nil	
	Central Argentine ..	3,700	21.9.35	127,745	+	22,258	12	1,424,517	1,519,446	+	94,929	"	23	131 ²	11	Nil	
	Do. ..	—	—	—	—	—	—	—	—	—	—	Dfd.	14	7	6	Nil	
	Cent. Uruguay of M. Video ..	273	21.9.35	8,600	—	10,087	12	98,937	201,327	—	102,390	Ord. Stk.	151 ²	3	4	Nil	
	Do. Eastern Extn. ..	311	21.9.35	1,453	—	552	12	16,157	17,724	—	1,567	"	—	—	—	—	
	Do. Northern Extn. ..	185	21.9.35	1,030	+	302	12	12,408	9,656	+	2,752	"	—	—	—	—	
	Do. Western Extn. ..	211	21.9.35	913	—	119	12	8,654	7,570	+	1,084	"	—	—	—	—	
	Cordoba Central ..	1,218	21.9.35	26,890	+	1,530	12	392,990	394,320	—	1,330	Ord. Inc.	6	3	2	Nil	
	Costa Rica ..	188	July, 1935	13,730	+	4,451	4	13,730	18,181	—	4,451	Stk.	305 ⁴	231 ²	34	57 ⁸	
	Dorada ..	70	Aug., 1935	12,900	+	1,600	35	93,300	81,500	+	11,800	1 Mt. Db.	103	95	102 ¹²	57 ⁸	
	Entre Rios ..	810	21.9.35	11,973	+	953	12	146,876	131,235	+	15,641	Ord. Stk.	211 ²	12	91 ²	Nil	
	Great Western of Brazil ..	1,082	21.9.35	5,500	—	4,500	38	273,500	287,600	—	14,100	Ord. Sh.	7 ⁸	3 ⁸	3 ⁸	Nil	
Canada.	International of Cl. Amer. ..	794	July, 1935	\$328,485	+	\$25,883	30	\$2,960,671	\$3,022,796	—	862,125	—	—	—	—	—	
	Interoceanic of Mexico ..	—	—	—	—	—	—	—	—	—	—	1st Pref.	1/-	1/-	12	Nil	
	La Guaira & Caracas ..	223 ⁴	Aug., 1935	3,855	—	75	35	31,425	29,820	+	1,605	Stk.	123 ⁴	76 ⁸	81 ²	Nil	
	Leopoldina ..	1,918	21.9.35	21,652	—	4,601	38	652,854	834,385	—	181,531	Ord. Stk.	145 ⁸	7	31 ²	Nil	
	Mexican ..	483	21.9.35	\$199,800	+	\$12,700	12	\$2,893,400	\$2,644,300	+	\$249,100	"	314	11 ²	1 ²	Nil	
	Midland of Uruguay ..	319	Aug., 1935	5,433	—	2,655	9	10,651	17,549	—	6,898	"	11 ²	1 ²	11 ²	Nil	
	Nitrate ..	401	15.9.35	4,836	—	—	37	105,970	98,973	+	6,997	Ord. Sh.	328 ²	51 ¹	21 ⁴	Nil	
	Paraguay Central ..	274	Aug., 1935	\$2,543,000	+	\$1,582,000	11	\$21,296,000	\$10,808,000	+	\$10,488,000	Pr. Li. Stk.	84	67	77 ¹²	72 ⁴	
	Paraguay Corporation ..	1,059	Aug., 1935	74,684	+	4,636	9	148,497	122,665	+	25,832	Pref.	141 ²	8	9	Nil	
	Salvador ..	100	14.9.35	49,925	—	22,519	11	129,411	106,977	+	22,434	Pr. Li. Db.	75	70	65	71 ¹⁶	
	San Paulo ..	1,531 ²	15.9.35	27,812	—	452	37	934,943	1,011,368	—	76,425	Ord. Stk.	86	67	431 ²	51 ⁴	
	Taltal ..	164	Aug., 1935	2,420	—	30	9	4,945	5,078	—	133	Ord. Sh.	21 ⁸	17 ¹⁶	11 ²	611 ¹⁶	
	United of Havana ..	1,365	21.9.35	13,619	—	377	12	209,055	205,365	+	3,690	Ord. Stk.	6	2	2	Nil	
	Uruguay Northern ..	73	Aug., 1935	570	—	445	9	1,182	2,071	—	889	Deb. Stk.	614	3	41 ²	Nil	
India & Far East.	Canadian National ..	23,714	14.9.35	744,471	+	26,872	37	23,215,756	22,760,981	+	454,775	—	—	—	—	—	
	Canadian Northern ..	—	—	—	—	—	—	—	—	—	4 p.c.	—	—	—	—	—	
	Grand Trunk ..	—	—	—	—	—	—	—	—	—	4 p.c. Gar.	1041 ²	971 ⁴	97	41 ⁸	73 ¹⁶	
Various.	Canadian Pacific ..	17,214	21.9.35	645,000	+	61,400	38	17,445,800	17,493,800	—	48,000	Ord. Stk.	1891 ⁶	1111 ⁶	10	Nil	
	Assam Bengal ..	1,329	31.8.35	32,857	—	4,284	21	487,505	583,946	—	96,441	Ord. Stk.	881 ²	72	301 ²	31 ⁴	
	Barsi Light ..	202	31.8.35	2,835	—	345	21	62,250	66,960	—	4,710	Ord. Sh.	1041 ²	985 ⁴	841 ⁸	57 ⁸	
	Bengal & North Western ..	2,114	10.9.35	49,397	+	8,210	22	1,111,403	1,121,918	—	10,515	Ord. Stk.	2971 ²	262	2971 ²	53 ⁸	
	Bengal Doonars & Extension ..	161	31.8.35	4,818	—	268	21	52,278	60,190	—	7,912	"	1251 ⁴	124	1251 ⁴	59 ⁶	
	Bengal-Nagpur ..	3,268	20.8.35	140,400	+	2,368	20	2,445,012	2,318,370	+	126,642	"	1051 ²	96	1011 ²	315 ¹⁶	
	Bombay, Baroda & C. India ..	3,072	20.9.35	191,850	—	525	24	3,602,475	3,658,725	—	56,250	"	115	1081 ²	1121 ²	55 ¹⁶	
	Madras & South'n Maharrata ..	3,230	31.8.35	134,775	—	35,850	21	2,282,570	2,528,881	—	246,311	"	131	1225 ⁴	1201 ²	77 ⁸	
	Rohilkund & Kumaon ..	546	10.9.35	9,027	—	1,130	22	212,138	219,419	—	7,281	"	263	250	2921 ²	51 ²	
	South India ..	2,526	31.8.35	120,468	—	11,954	21	1,718,814	1,773,264	—	54,450	"	119	115	1161 ²	67 ¹⁶	
	Beira-Umtali ..	204	July, 1935	64,040	+	1,806	43	640,305	519,179	+	121,126	—	—	—	—	—	—
	Bilbao River & Cantabrian ..	15	Aug., 1935	1,162	—	196	35	12,197	14,340	—	2,143	—	—	—	—	—	—
	Egyptian Delta ..	622	10.9.35	6,124	—	828	22	88,869	90,862	—	1,993	Pr. Sh.	2131 ⁶	154	134	511 ¹⁶	
Great Southern of Spain ..	104	14.9.35	1,361	—	1,502	37	65,617	78,235	—	12,618	Inc. Deb.	4	31 ²	31 ²	Nil	Nil	
Kenya & Uganda ..	1,625	Aug., 1935	168,664	+	8,252	35	1,642,084	1,545,502	+	96,582	"	—	—	—	—	—	
Manila ..	—	—	—	—	—	—	—	—	—	—	B. Deb.	50	33	40	81 ⁴	415 ¹⁶	
Mashonaland ..	913	July, 1935	111,714	—	4,769	43	1,159,674	956,615	+	203,059	1 Mt. Db.	101	915 ⁴	1031 ²	415 ¹⁶	551 ⁶	
Midland of W. Australia ..	277	July, 1935	11,008	—	889	4	11,008	11,897	—	889	Inc. Deb.	100	93	941 ²	515 ¹⁶	551 ⁶	
Nigerian ..	1,905	3.8.35	17,237	—	11,900	18	437,347	458,506	—	21,159	"	—	—	—	—	—	
Rhodesia ..	1,538	July, 1935	199,144	—	6,699	43	1,922,683	1,611,125	+	311,538	4 p.c. Db.	1047 ⁸	971 ²	104	315 ¹⁶	551 ⁶	
South African ..	13,225	31.8.35	566,412	—	36,005	22	11,952,248	10,771,669	+	1,180,579	—	—	—	—	—	—	
Victorian ..	4,728	May, 1935	771,592	+	6,634	48	8,734,254	8,481,557	+	252,697	—	—	—	—	—	—	
Zafra & Huelva ..	112	July, 1935	11,227	+	167	30	76,472	76,861	—	389	—	—	—	—	—	—	

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16

† Receipts are calculated @ 1s. 6d. to the rupee. § ex dividend. Salvador and Paraguay Central receipts are in currency

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being over estimated. The statements from July 1 onwards are based on the current rate of exchange and not on the par value